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Instructions for Use of Index

This index is essentially a subject index, not an index of titles, and articles treating a number of different subjects are indexed under each of them. In addition, a geographical reference is published wherever the article relates to any particular railway company, or to the State matters of any particular State. The geographical method of grouping serves to locate in the index any article descriptive of practices, conditions, events, etc., when the searcher knows the electric railway, city or State to which the article applies. Groupings are made under the name of the city in which the main office of the company is located, but an exception is made in the case of electrified sections of steam railroads, such entries being made direct under the name of the railroad. City or State affairs appear direct under the names of the city or State involved.

In the subject index, the alphabetical method is followed, and if there is a choice of two or three keywords the one most generally used has been selected, cross references being supplied. Below will be found

a list of the common keywords used in the index to this volume. This list has been subdivided for convenience into sixteen general subjects, but the general subject headings, shown in capital letters, do not appear in the body of the index. As an example, if a reader wished to locate an article on power-driven tower wagons he would obviously look in the list under the general subject "vehicles," and of the two keywords that appear under this caption, only "Service and tower wagons" could apply to the article in question. The reader would therefore refer to this keyword under "S" in the body of the index.

In addition to the groups of articles covered by these headings the papers and reports from railway associations are grouped under the names of the various organizations. Proceedings of other societies are indexed only in accordance with the subject discussed. Short descriptions of machine tools appear only under the heading "Repair Shop Equipment" and are not indexed alphabetically, because of the wide choice in most cases of the proper keyword.

CLASSIFIED LIST OF KEYWORDS

ACCIDENTS AND LEGAL

Accidents (including wrecks)
Accident claim department
Legal
Public service and regulative commissions
Safety-first movement

CARS

Car construction
Car design
Cars (descriptive)
Lubrication
Heating of cars
Lighting of cars
Motor cars, gasoline
One-man cars
Work and wrecking cars

CAR EQUIPMENT

Axles
Bearings
Brakes
Controllers
Couplers
Gears and pinions
Motors
Seats
Trucks
Wheels

EMPLOYEES

Employees
Labor
Life insurance
Strikes and arbitrations
Wages
Women conductors
Women employees

FARES

Fare collection (including apparatus)

Fares
Fare increases
Freight rates
Transfers
Zone fare system

FINANCIAL AND STATISTICS

Accounting
Appraisal of railway property
Depreciation
Financial
Franchises
Operating records and costs
Statistics
Traffic investigations

HEAVY ELECTRIC TRACTION

Heavy electric traction (general)
High-voltage d.c. railways
Locomotives

MAINTENANCE OF EQUIPMENT

Maintenance records and costs
Paints and painting
Repair shop equipment
Repair shop practice
Repair shops
Tests of equipment
Welding, special methods

TRANSPORTATION

Energy checking devices
Operating records and costs
Passenger handling records
Signals
Stopping of cars
Train operating practice

POWER

Boiler room practice
Coal
Energy consumption

Feeders
Overhead contact system
Poles
Power distribution
Power stations and equipment
Substations and equipment
Substations, automatic
Third-rail contact system
Transmission lines
Turbo-generators and equipment

RECORDS

Maintenance records and costs
Operating records and costs

STRUCTURES

Bridges
Carhouses and storage yards
Power stations and equipment
Repair shops

TRACK

Rail joints and bonds
Rails
Special work
Ties
Track construction
Track maintenance

TRAFFIC

Advertising
Freight and express
Publicity
Traffic investigations
Traffic stimulation

VEHICLES (not on tracks)

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Service and lower wagons

MISCELLANEOUS

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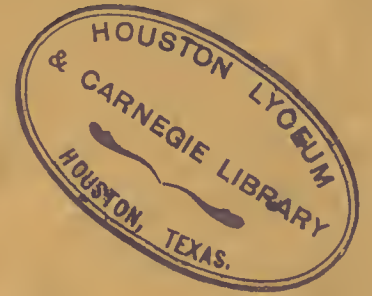
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ELECTRIC RAILWAY JOURNAL

July 6, 1918



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Electric Railway Journal

H. W. BLAKE, Editor

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Spies and Lies

German agents are everywhere, eager to gather scraps of news about our men, our ships, our munitions. It is still possible to get such information through to Germany, where thousands of these fragments—often individually harmless—are patiently pieced together into a whole which spells death to American soldiers and danger to American homes.

But while the enemy is most industrious in trying to collect information, and his systems elaborate, he is *not* superhuman—indeed he is often very stupid, and would fail to get what he wants were it not deliberately handed to him by the carelessness of loyal Americans.

Do not discuss in public, or with strangers, any news of troop and transport movements, of bits of gossip as to our military preparations, which come into your possession.

Do not permit your friends in service to tell you—or write you—"inside" facts about where they are, what they are doing and seeing.

Do not become a tool of the Hun by passing on the malicious, disheartening rumors which he so eagerly sows. Remember he asks no better service than to have you spread his lies of disasters to our soldiers and sailors, gross scandals in the Red Cross, cruelties, neglect and wholesale executions in our camps, drunkenness and vice in the Expeditionary Force, and other tales certain to disturb American patriots and to bring anxiety and grief to American parents.

And do not wait until you catch someone putting a bomb under a factory. Report the man who spreads pessimistic stories, divulges—or seeks—confidential military information, cries for peace, or belittles our efforts to win the war.

Send the names of such persons, even if they are in uniform, to the Department of Justice, Washington. Give all the details you can, with names of witnesses if possible—show the Hun that we can beat him at his own game of collecting scattered information and putting it to work. The fact that you made the report will not become public.

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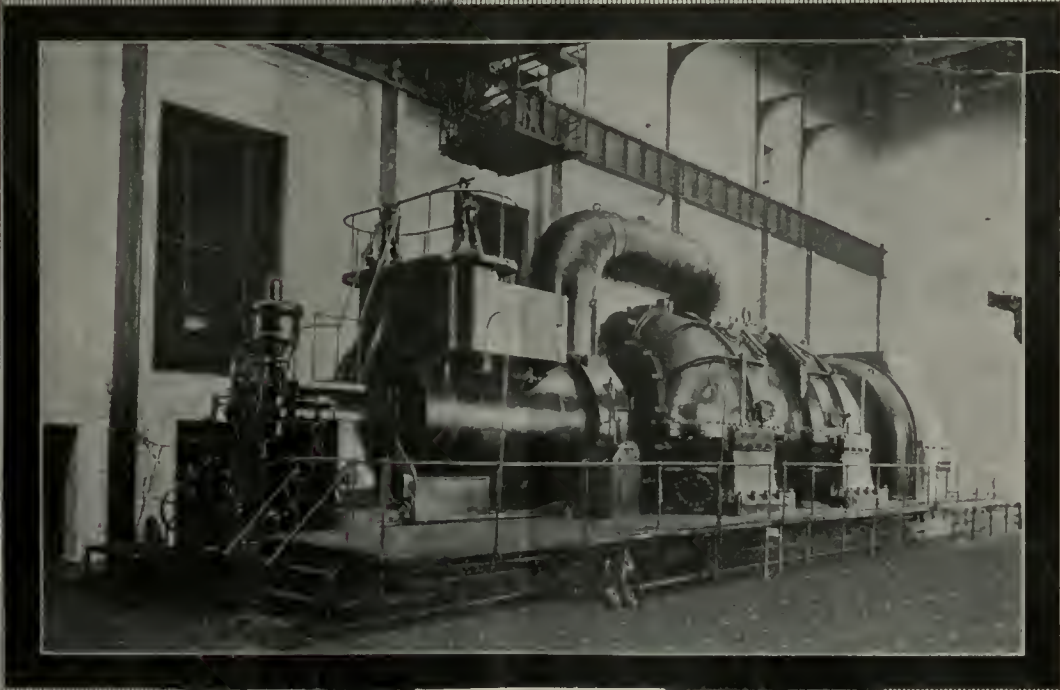
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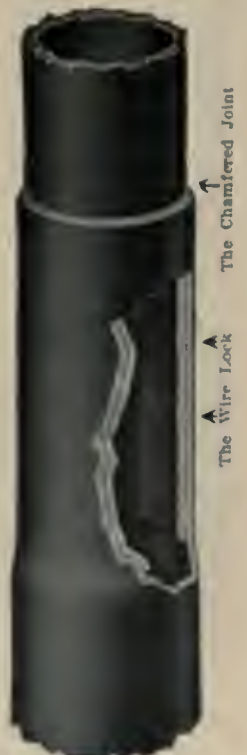
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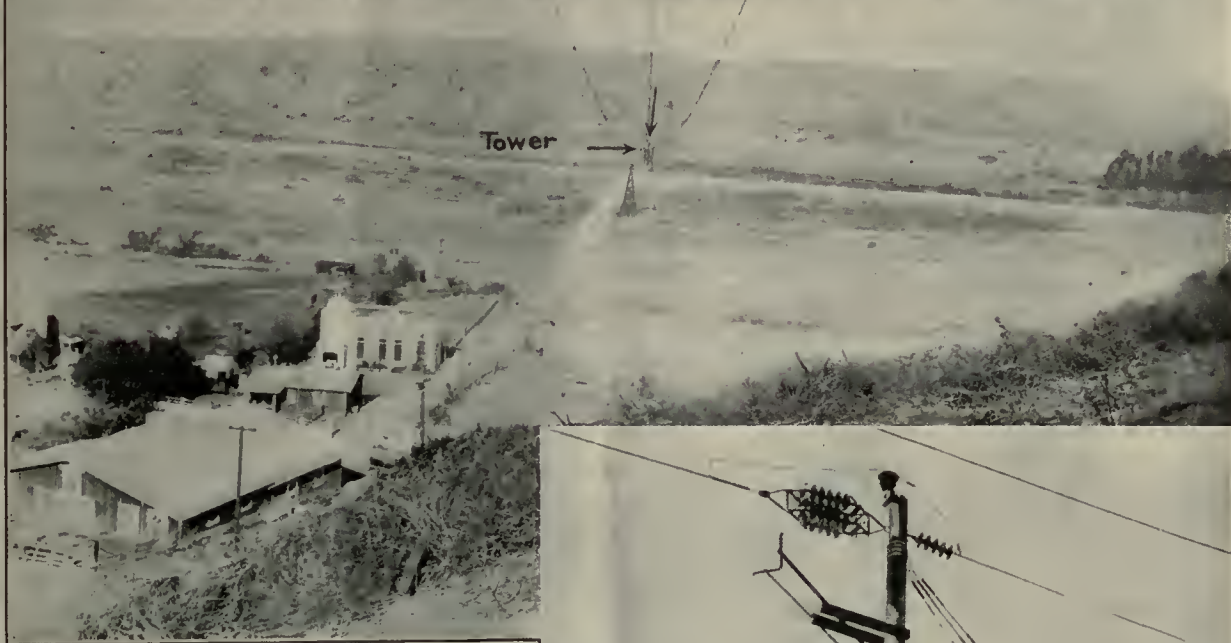
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WESTERN RED CEDAR POLES



Views showing construction of lines of the San Diego Consolidated Gas & Electric Company near San Diego, California.

Upper picture shows Mission Valley. Through it flows the San Diego river, which is subject to periodical floods, making impractical the erection of permanent structures in the river bed.

Upper picture also shows the location of one of the two towers supporting the 3069 foot span. These towers are erected at a difference in elevation of 100 feet. The towers could not be erected at the tops of the side hills owing to right-of-way difficulties.

The side picture shows the north tower built of

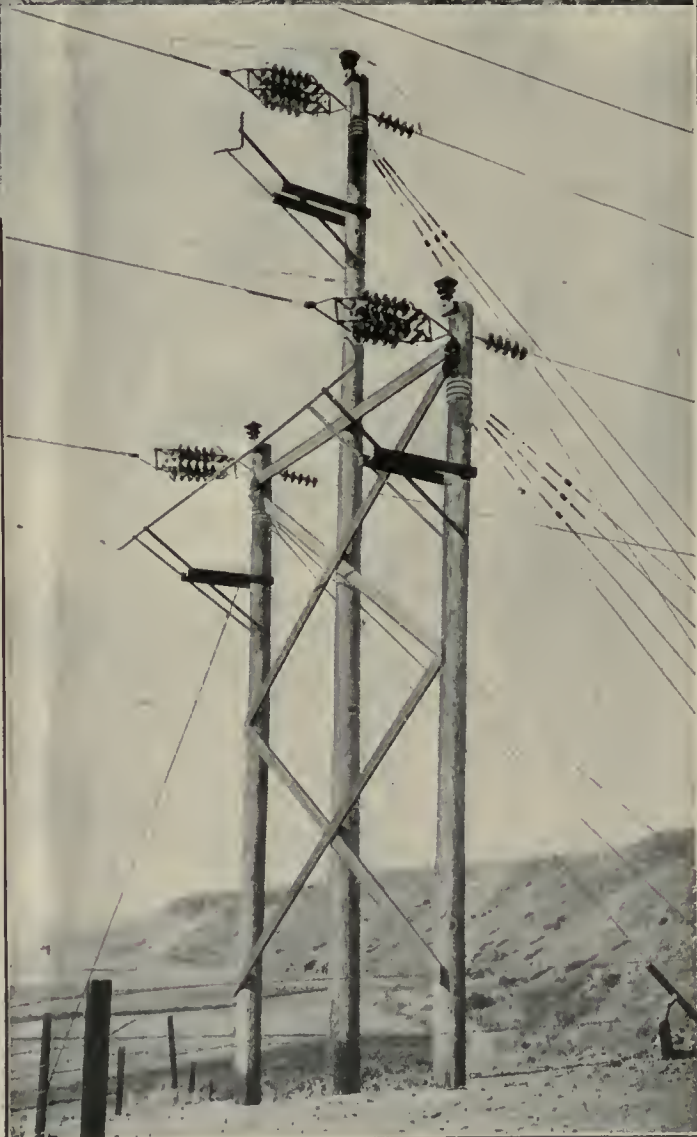
Western Red Cedar Poles

(two 45 foot and one 60 foot). The line is a 66 K.V. three-phase transmission running between San Diego and San Juan Capistrano, California, permitting the tying of the system of the San Diego Consolidated Gas & Electric Company to that of the Southern California Edison Company at the latter point. The wires in this span are 7/16 in. extra galvanized extra high strength steel (22,500 lb.). Each wire is under a tension at 60 degrees F. of 8750 lb., dynamometer measurement.

(Photographs taken in January when river bed was dry—The "A" frame tower in center has no connection with this construction.)

Western Red Cedar Association

Peyton Bldg., Spokane, Wash.



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Bridgeport Brass Company
Bridgeport Connecticut

"Go Ahead, the Block's Clear"

*Says Chapman
Automatic Signal*



When the car approaches the signal and the semaphore is in a diagonal position, like this photograph taken on the Portland & Lewiston Interurban Ry. System, the block is clear. If, on passing the trolley contactor, the arm assumes a vertical position the car may proceed. Should the arm be vertical on reaching the signal it means a car is in the block going away from you, if horizontal a car is approaching.

CHAPMAN Automatic Signals are in use on many well-operated interurban electric roads because they have found this system highly efficient, perfectly reliable and very economical to maintain.

The red semaphore arm is 18 in. long and operates on a hooded white disk 24 in. in

diameter. This can be seen a long distance at any time of day or night in all weather.

When desired, hooded colored lights will be furnished.

For speeding up the movement of cars and reducing the liability of accidents you should investigate the Chapman System.

Write for Information

Charles N. Wood Company

14 Federal Street, Boston, Mass.

LINE MATERIAL ECONOMY

SMOOTH RUNNING SAMSONS



The Samson Splicer is installed without special tools, stays upright in the line, does not make a hard spot, and is non-arcng.

This splicer has met every requirement of a large number of the most critical line superintendents in the United States.

It is of liberal proportions throughout, the de-

sign being such as to make a sturdy splicer and yet not adding undue weight to the line.

The set screws are placed at a slight angle so that the stresses in the splice are evenly balanced and the trolley held firmly.

The Samson Splicer has strength in excess of new wire, and after years of service is still smooth running.

DREW CLINCH EARS



Drew Clinch Ears are all one-piece castings, with deep groove, made to A.E.R.A. specifications as to composition, that is, 84% copper, 10% zinc, 3% tin, 3% lead.

Unless specially ordered no milling is done, inside or out of the groove, so that the gripping power of the hard grainy, dense exterior portion of the casting is retained, preventing "slippage" and offering greater resistance to wheel-wear.

The concave sides of the boss eliminate wheel

bumping on straight line or curve without sacrificing strength. The ends are built up heavier, which prevents them from being pushed up from the wire in service, and yet the design of the ear provides a sufficient flexibility to prevent annealing of the wire by wheel passage.

The long life of Drew Ears has proved to be a pronounced saving in yearly maintenance cost on many properties. Is your road one of these? If not, ask for further proof and sample.

Catalogue 18 sent on request.



The Mark of Quality

**DREW ELECTRIC &
MFG. COMPANY**

Offices and Works:

1016 E. Michigan St., Indianapolis, Ind.



The Mark of Quality



Just Off the Press: Send for Your Copy

One hundred and four pages of sound logic and data with which every well-posted electrical engineer should be familiar. This book is not merely a catalog, but treats in a helpful way with the following subjects:

Notes on wire manufacture in general.

Physical properties of composite (Copperweld) Wire, including conductivity, resistivity, temperature coefficient of resistance, proportional currents in copper and steel, heating effect, carrying capacity, effective resistance with alternating currents, self-inductance and reactance with alternating currents, distribution of tensile strength over the cross section, resistance to stretch under load, etc.

Tests on Copperweld Wire and specifications for various uses.

Types and sizes of Copperweld line wire for high tension trolley, telegraph, telephone, signal and fire and police alarm systems.

Copperweld strand, twisted pairs, weatherproof wire, bond wires, tie wires, ground rods, etc.

Calculation of line drop.

Calculation of feeders and short transmission lines, including single-phase two-wire, three-phase three-wire, two-phase four-wire, and unbalanced poly-phase systems, wire spacings, economical transmission voltage, etc.

Sag and tension in spans, including advice on safe loading and effect of temperature changes.

Standard information on electrical units, properties of elements, comparison of wire gauges, measures of volume, area, length, pressure, weight, work, etc. Conversion tables.

In view of the exceptional savings and improvements that can be effected with Aristos Copperweld Copper Clad Wire, every well-posted electrical man should have the above valuable information at hand for quick reference.

If you are a consulting, designing or managing engineer, your free copy is ready for mailing upon request—and the engineering advice of our own engineers is equally free to prospective customers.

PAGE STEEL & WIRE CO.

Established 1883 as Page Woven Wire Fence Co.

Makers of Copperweld Copper Clad Steel Wire; Armco Welding Rods and Electrical Wire; Wire Mill Products, Plain and Galvanized; Wire of Special Analysis; Wire Fencing for all Purposes; Factory Gates; Ornamental Iron Fence; Machine Guards; Tool and Stockroom Partitions; Architectural Iron.

FACTORIES: Monessen, Pa., and Adrian, Mich.

GENERAL SALES OFFICES: 30 Church St., New York.

WESTERN REPRESENTATIVES:

Steel Sales Corporation, Adams and Jefferson Sts., Chicago.



Drawn from the product of
Copper Clad Steel Co. Pittsburgh





The ERICO Portable Welder

For Rail Bonding

What They Say about it—

Manager—“Inexpensive.”

Engineer—“Good bonding.”

Return Circuit Dept.—“Saves man power.”

Operating Dept.—“No interruption to traffic.”

Bonding Foreman—“Easy to handle.”

This outfit makes everybody feel good because the bonding is done easily and economically, and the operating department is pleased by having good voltage that enables them to maintain schedules. Take one and see.



The Electric Railway Improvement Co.
Cleveland

"Armco" Iron Culverts

under heavy fills

on the

Northwestern Pacific



534

The builders of the Northwestern Pacific Railroad encountered great difficulties in securing foundations for bridges and culverts. In many places the use of masonry in any form was impracticable. "Armco" Iron Corrugated Pipe, because of its toughness and resiliency, was found to be the practical solution.

Once in place they are there for a lifetime

Their material is

The Iron That's Made to Last

Write or phone the nearest manufacturer for full information as to Rust-Resisting "Armco" Iron Culverts, Flumes, Signs, Sheets, Roofing and Formed Products.



Resists Rust

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Dixie Culvert & Metal Co.
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California, West Berkeley
California Cor. Culvert Co.
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Delaware, Clayton
Delaware Metal Culvert Co.
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Reciprocating Grinder in operation in Houston, Texas.

Only the Reciprocating Grinder Allows a Laborer to Handle Roughest Cut to Most Refined Finish With Success—

The Reciprocating Track Grinder is as well known in Houston, Texas, as in Brooklyn, New York, New Haven, Connecticut, Sacramento, California, and scores of other communities.

At Houston it is used for a wide range of applications, from the grinding away of excess metal in electrically welded joints to the smoothest toning down of manganese and other special work.

Even the most skillful operator of other types of grinders cannot approach the perfect grinding which a Mexican peon or any ordinary unskilled laborer can obtain with the Reciprocating Track Grinder. This fact alone is worth your attention when good trackmen are so scarce. Put your money into the machine that will make you least dependent upon human skill and high-priced labor.

Railway Track-work Company

30th and Walnut Streets, Philadelphia

AGENTS: Holden & White, Inc., 343 S. Dearborn St., Chicago.



***“Here you are,
beat that
record for a
round trip!”***

The above challenge from one motorman to another is characteristic of the *constant interest and stimulus which impel the ECONOMY-Metered motormen to save power.*

Few men are willfully wasteful, and when encouraged in the proper understanding of *how* to save power, the motorman has the additional incentive of *competition*, he takes a decided *interest* in saving power.

This understanding is easily acquired by the motorman through observance of his trip readings on

The ECONOMY Meter

The Device That Meters The Energy—And That's What You Want to Save

This is the only device which measures car operating efficiency directly in units of energy consumption and that, in the final analysis, is the only real basis for accurately determining power saving.

It is not a question of recording how long the motorman applies power and brakes or how long he coasts, but of how much power he saves, and to this end correct notching-up in order to operate the equipment at its highest efficiency is a vital necessity, as is the correct taking of grades and correct use of the brake.

How to accomplish and maintain these important essentials to power saving is speedily learned by the ECONOMY-Metered motorman. He sees what he saves and constantly strives to save, encouraged by a spirit of co-

operation and by the stimulus of competition with his fellow workers.

By writing his own “power bills” and seeing them constantly, the motorman learns how to save energy by proper acceleration, proper coasting, proper braking, and by observing his progress he learns how to maintain these savings.

The matter of initial investment and maintenance costs in a device of this kind are also of prime importance. We invite your consideration of these features particularly in connection with ECONOMY Meters.

*Illustrated Booklet
sent you on request*

Write for a copy



“The Watchdog of Your Power”

Economy Electric Devices Company

L. E. Gould, Pres.

Exclusive Sales Agent

Sangamo Economy Railway Meter, Old Colony Bldg., Chicago

BY RECENT contract arrangements we, and our agents listed below, are now the exclusive sales representatives of all the equipment and rail joints formerly exploited by the Atlantic Welding Company of New York, in addition to our regular products.

Lincoln Process Welding Dynamotors

In paved construction with the Lincoln Process of Arc-Welding, and Gailor Joints, rails may be joined permanently, quickly, and at lowest cost, without interrupting car traffic while welding is in process, and without the use of heavy, cumbersome and expensive welding equipment.

These joints can be installed with but three men at the rate of 2 to 2½ per hour, under 3-minute traffic.

The equipment is also applicable for building up cupped rails, installing Lincoln Bonds and performing shop repairs.

On private right of way the Lincoln Dynamotors are ideal for applying bonds for the return circuit. By the Lincoln System the bonds are attached permanently, quickly, at lowest cost, and the work may be done without interrupting regular traffic schedules.

They can be welded with but ½ Kw. per bond, in 45 seconds.

Bonds can be applied at the rate of over 150 per day.

Lincoln Bonds effect a saving of 25 to 35 cents per bond.

Gailor Joints Shop Welding Lincoln Bonds



Gailor Welded Rail Joint



Lincoln Bond Welded
to Rail



Bond Removed to Show
Contact Area

"THE BOND EVERLASTING"

It will pay you to investigate the advantages offered by the use of this equipment, because of the unusual economy in materials and labor, and rapidity in accomplishing the work.

Write us or our nearest agent and let us give you details.

The Lincoln Bonding Co.

General Offices: Cleveland

New York Office: 30 Church Street

AGENTS:

BOSTON Chas. N. Wood Co.
PHILADELPHIA, Railway Track-work Co.
PITTSBURGH, Electrical Engineering & Manufacturing Co

AGENTS:

CHICAGO, Holden & White, Inc.
ST. LOUIS W. L. Rose Equip. Co.
CANADA Lyman Tube & Supply Co., Ltd., Montreal, Toronto, Winnipeg

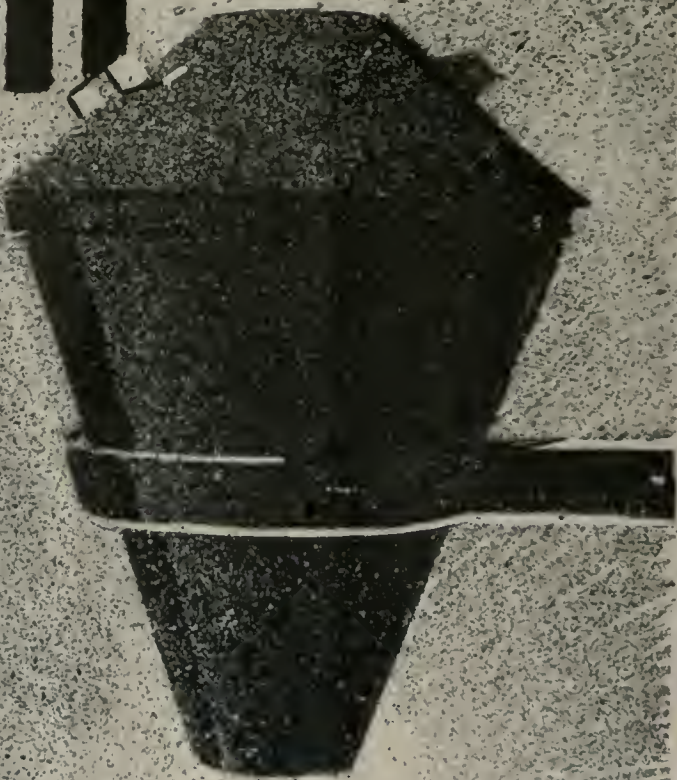


WHERE the wheel loads are heavy and the speeds high; where the wheel service is most severe; there you will find the Davis One-Wear Manganese Steel Wheel making records for high mileage capacity and low maintenance costs.

American Steel Foundries
1100 McCormick Bldg. CHICAGO

DAVIS STEEL WHEELS

THERMIT RAIL WELDING



SIMPLICITY

The simplicity of the Thermit apparatus used to weld rails enables you to undertake the welding of a small or a large number of joints with equal facility. The weld and reinforcement of Thermit steel fused around it insures an electrical conductivity equal to that of the rail itself; at the same time, the full strength of the rail is developed.

Write for Catalog today.

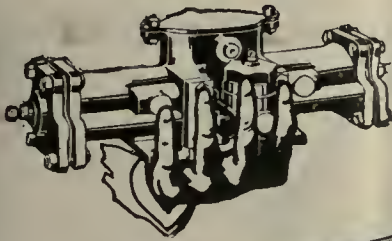
**Metal & Thermit
Corporation**

120 Broadway, New York

Successors to

Goldschmidt & Detinning Co.
Goldschmidt & Thermit Co.





National Pneumatic Door and Step Control

Make for High Schedule Speeds at Cleveland

Despite the operation of big trailers, the Cleveland Railway has a higher schedule speed than many a railway which operates single motor cars only.

One reason for this is the adoption of the skip-stop; and another is the extensive use of pneumatically-operated doors and steps.

As at Detroit, every car with pneumatic door and step control is equipped with **National Pneumatic** door engines.

NATIONAL PNEUMATIC COMPANY

INC.

50 Church St. New York



515 Laflin St. Chicago



Coil Repairs vs. Coil Restoration

Repairs to field and armature coils are costly or cheap according to the thoroughness with which the work is done. Careful work and the best materials make it possible to restore coils to their original state. That is always the most economical method. The difference in cost between the cheapest materials and the best is negligible.

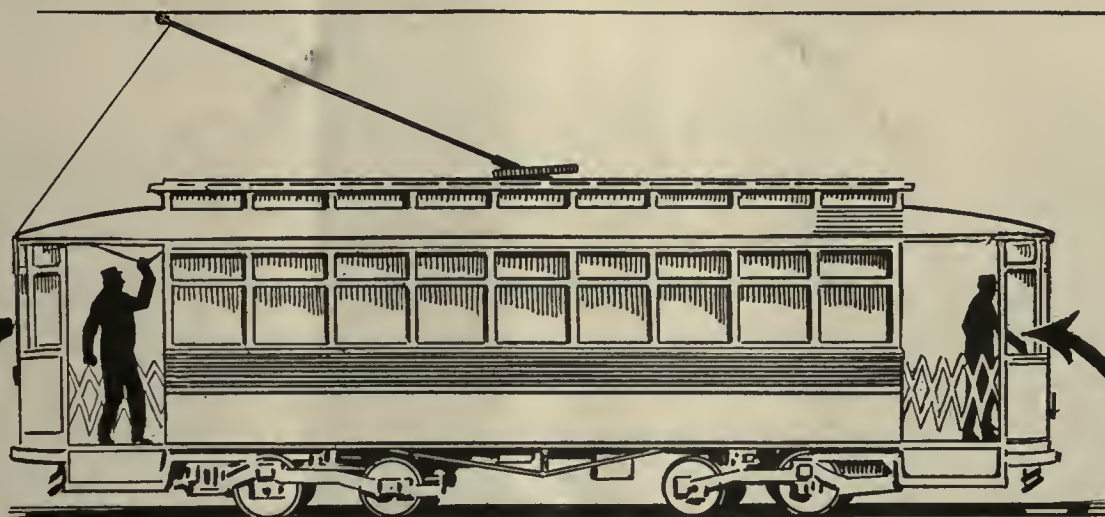
For coil repairs, for taping cable leads and all other insulating windings, specify

Irvington Black Varnished Cambric

Time Proves Its Superiority

Black and Yellow Varnished Cambric
 Black and Yellow Bias Cambric Tape
 Oiled Silks Oiled Papers
 Black and Yellow Insulating Varnishes
 Black and Yellow Flexible Varnished
 Tubing

IRVINGTON VARNISH & INSULATOR CO.
 Irvington, New Jersey.



It is
hard to get
increased income
here

As long
as there is
unchecked waste
here

When one of your department managers comes to you and says he has to have more money to run things (a mighty common experience nowadays), your first impulse is to try to determine how he can economize, isn't it?

And naturally the public and the Public Service Commissions ask the same question when the electric railways ask for more revenue.

The only decisive answer is to show that you are doing everything possible to lower costs of operation.

You cannot make that answer unless you have *some* means of showing that your car crews are being led to use the minimum amount of power necessary to first-class operation.

There are many ways of doing this. It is our belief that

The Arthur Power-Saving Recorder

is a successful, economical and efficient way.

That belief is also held by experienced railway men who are using the Arthur Recorder on their cars.

You might not agree with this opinion, but you certainly owe it to yourself to be sure that you know all the facts before you reach your conclusion.

The Arthur Power-Saving Recorder Co.

Second National Bank Building, New Haven, Conn.

V. V. NO SPLICE BLOCKS

FOR EASY, QUICK WIRING



Time today is worth more than money and quick wiring devices are absolute necessities for your wiremen, to enable them to produce efficient results.

Spliced joints are not only laborious but also uncertain and where reliability is imperative the installation of

V. V. NO SPLICE BLOCKS

Solves the question of grounds, short circuits and miscellaneous troubles.

NO TORCH, NO SOLDER, NO RUBBER AND NO FRICTION TAPE is required to install drop lights, receptacles, nipple cover outlets, etc. All wires are fastened directly to the V. V. No Splice Block, making a neat, compact installation. Exceptionally easy to connect—lots of room to work, as all connections are made on the surface and not inside of the fitting. Does away with looping, and short ends of wire may be used up in wiring from outlet to outlet.



Blank and
One Hole
Rosette Cover



2, 3 or 4
Hole Cover



Male or
Female
Nipple Cover



613—Receptacle



Any style of cover or receptacle can be mounted on the V. V. No Splice Block after connections have been made and which can be changed at any time without disconnecting or reconnecting any wires. The V. V. No Splice Block fits directly on the No. 1 size Type 5 Series V. V. Fittings, and our complete catalog and information will be mailed free upon request.



V. V. FITTINGS COMPANY

PHILADELPHIA, PA., U. S. A.

NEW YORK

CHICAGO



When Brigham Young and his brothers first caught a glimpse of the great Salt Lake on July 24, 1847, the leaders of the Mormons exclaimed: "This is the Place!—Here will the House of the Lord be erected!"

\$1,000 for a Bushel of Wheat!

That's what James Bridger offered to pay Brigham Young in July, 1847, for any wheat grown on the Salt Lake Territory. But he reckoned without the courage, diligence and persistency of these Mormons. They succeeded in turning the most desolate part of Utah into a veritable garden.

In the subsequent development of Salt Lake City a great deal of credit is due to the excellent street railway system which for the past two decades has been the pride of the Mormon City. Old residents still remember the ridiculous little coaches first installed, which were pulled by mules at the rate of 20 to 60 *minutes per mile*—"according to the weather." The fare was

10c a trip—and the longest trip was about a mile! Transfers could be obtained—for another dime! And there were large printed signs in the cars reading:

"Nobody has a license to swear or kick except our conductors and the mules!"

Finally, the stubborn, kicking mules gave way to electricity in 1889. From that year dates the development of the Salt Lake City and suburban service which today is remarkable for its speed and its comprehensiveness. The city now points with pride to its street railroads, which helped them turn an arid desert into fertile and beautiful suburban districts.

Galena Oils

and Galena Service for nearly half a century, have played an important part in such suburban developments in nearly every American city by helping the street railroads to correct solutions of their lubrication problems and by placing at the disposal of their customers the combined and cumulative experience of Galena engineers throughout the country.

Galena-Signal Oil Co.
Franklin, Pa.

Water- and Dust-Tight Condulets

V and VH Series with Key Socket Attachment



Type V—One of a Complete Series of Condulets Particularly Adapted for use
in Textile and Flour Mills—Made in All Combinations and
Sizes—Brass or Iron, as Specified

WRITE FOR CONDULET BULLETIN No. 1000H

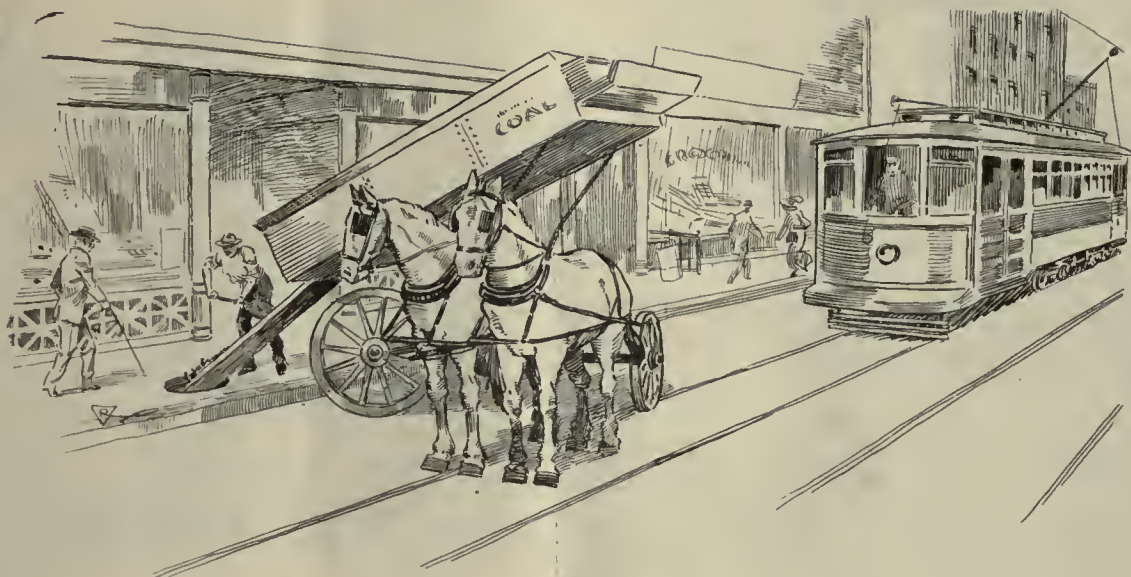
CROUSE-HINDS COMPANY

SYRACUSE, N. Y., U. S. A.

NEW YORK

BOSTON

CHICAGO



A Common Cause of Collision

on systems is obstructions, like standing coal drays where the motorman is in the habit of running with power on up to the last second and then jamming on the brakes.

That habit is broken and those collisions are prevented by the use of a

Rico Coasting Recorder



which offers an incentive for the motorman to be watchful for the opportunities to secure a maximum of COASTING TIME, by running down to such visible obstructions with power off.

Time is the Essence of Railroading

RAILWAY IMPROVEMENT CO.



61 BROADWAY, NEW YORK



The "Shock" Test Machine

Every "Electroheat" quenched and tempered axle is subjected to a "Shock" Test, which, although not sufficient to exceed the elastic limit of the steel thus causing a permanent bend or set, will develop to a point of immediate failure any axle having defects or internal strains liable to cause failure in service. Thus are "Electroheat" Axle users again assured of maximum axle safety and service!

MAXIMUM safety and service from heat treated car axles is dependent largely on the most careful attention to all details of the process of refining the steel structure.

"Electroheat" Axles combine maximum safety with service because they are heated in an **electric furnace**—a process originated and practised exclusively in the production of axles by the Laclede Steel Company and because the most minute detail is given proper consideration throughout the complete heat cycle.

The gradual and uniform absorption of heat in the production of "Electroheat" quenched and tempered axles, precludes

the possibility of developing internal heating strains, usually set up by "fuel" furnace methods of heating, and which are so frequently a cause of axle failure. Subsequent cooling to predetermined temperature and **scientifically** completing the heat cycle, further insures a **safe** axle of **serviceable** quality.

That's why "Electroheat" Axles minimize service failures due to breakage, bending and excessive journal wear. They **have** to give better service.

Note: "Electroheat" Armature shafts possess the same torsional and shock-resisting qualities as "Electroheat" Axles, being heat treated by the same process. They minimize service breakdowns and maintenance costs.



"If Heat-Treated Electrically—It's a VALSCO"

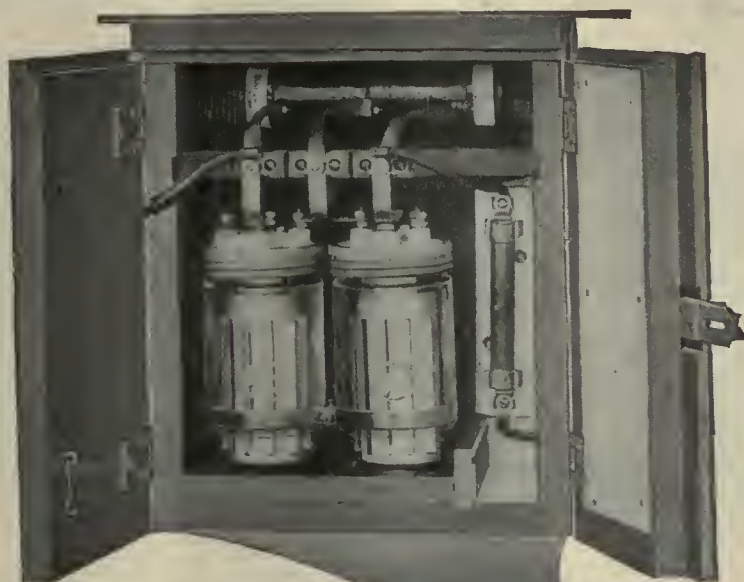
LACLEDE STEEL COMPANY

General Offices, Federal Reserve Bank Building

Saint Louis, Mo., U. S. A.

Maximum Safety and Service

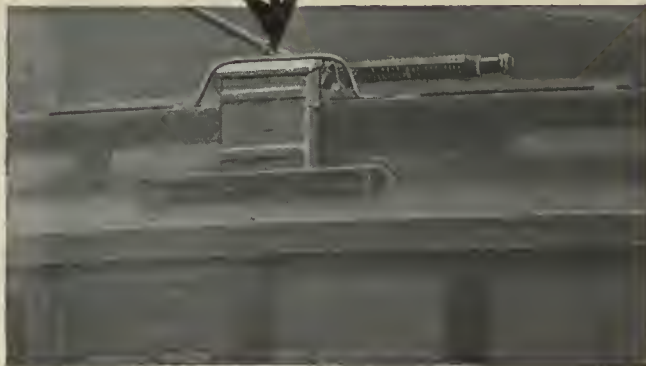
—*"Electroheat"*
Axles



Are You Having “Cripples” This Month?

The electric railway without the best lightning protection is invariably crippled many times throughout the summer months. The Beaver Valley Traction Company of New Brighton, Pa., up to 1915 was no exception to this statement. Mr. W. H. Boyce, Superintendent of that company says:

“We cannot recommend G-E electrolytic lightning arresters too highly. We purchased the 24 arresters which we have in use in 1915, but were a trifle late in the season getting them on. That year we had 9 cars crippled by lightning disturbances. In the year 1916 we had *no* cripples from lightning. In the year 1914, 42 cripples; in 1913, 47 and in 1912, 48.



Mr. Boyce's case is not different from yours. But since he has found the value of G-E electrolytic arresters, his troubles in that direction are over.

You can learn more about these arresters from our nearest office.

General Electric Company

Atlanta, Ga.
Baltimore, Md.
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General Office: Schenectady, N. Y.

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Philadelphia, Pa.
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Providence, R. I.
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St. Louis, Mo.
Salt Lake City, Utah
San Francisco, Cal.
Schenectady, N. Y.
Seattle, Wash.
Spokane, Wash.
Springfield, Mass.
Syracuse, N. Y.
Toledo, Ohio
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Youngstown, Ohio

*Southwest General Electric Company. For Canadian Business refer to Canadian General Electric Company, Ltd., Toronto, Ont.
General Foreign Sales Offices: Schenectady, N. Y.; 120 Broadway, New York City; 83 Cannon St., London, E. C., England.



There's a Right Grade of Brush for every Motor

The selection of carbon brushes for railway motors calls for exact knowledge of conditions and equipments. It is impossible for one grade of brush to fit satisfactorily all equipments.

Commutator troubles are often caused by inserting the brush that happens to be handiest without regard to the requirements. For this reason

G-E Brushes

are furnished in grades to meet any condition. The exact grade for your particular motors can be determined by our specialists after a study of the situation.

General Electric Company

General Office:



Schenectady, N. Y.

Sales Offices in All Large Cities

Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

Volume 52

New York, Saturday, July 6, 1918

Number 1

Release Needless Platform Man Power

JUST before America's entry into the war the manager of a Southern railway wished to change to one-man operation, for which his town is ideal. The news got to the men in such distorted fashion that they thought one-half would lose their jobs at once. There followed the threat of a strike, the manager's toes chilled at once, and no more was done in the matter. In the meantime a great shipyard was begun near by and the men who had been so worried about their jobs on the cars began to leave in droves. Of course, there was also the effect of the draft to make matters worse. For all that, the property is still run with two men on cars that need little more than air equipment to serve as one-man cars.

This is not an isolated case. There are scores and scores of cities equally adapted to change to one-man operation. Instead of timorously hoping that the next one or two drafts will leave them unscathed, these companies should get busy now to reconstruct their cars at least as fast as their men leave or are taken from them. Any attempt of medium-sized roads to compete with war wages is out of the question, except by reducing the number of men required to run an equal or even a greater number of cars.

Engineering and Transportation Are of Primary War Importance

THE operations of an army in the field depend now so much upon engineering that this war has well been termed largely a war of engineers. That the members of the engineering profession in the United States have responded to the call made upon them is shown by the fact, brought out at the A. I. E. E. meeting last week by General Black, that our four principal engineering societies have more than 10 per cent of their members in the service, this percentage rising, in the case of the A. S. C. E., to 14½ per cent. According to the same speaker, also, there are in the Engineer Corps of the regular army some 8000 commissioned officers and 200,000 enlisted men with engineering experience, and probably an equal number of men with engineering experience in other branches of our military forces. To these must be added, of course, to get the total engaged in war work, the very large number of engineers engaged in the construction at home of war equipment and its transportation, as well as in other allied war activities.

General Black used the figure of 25 lb. as the amount of supplies required by an army at the front per man

per day, and to deliver this finished product at the front means, of course, not only its transportation to an American port and then across the sea, but the transportation at home of many times that weight of raw material to the factory as well as of the workers themselves to and from their work. All this means that engineers and transportation men have an especial responsibility in this war to put forth their best efforts to defeat the enemy. Those not able to engage directly in foreign military service should do everything they can at home to maintain their efficiency and output to the uttermost.

McAdoo's 1-Cent Rate for Soldiers Should Not Injure the Interurbans

HOW will interurban electric lines be affected by Director-General McAdoo's order that soldiers and sailors under certain conditions shall be entitled to a rate of transportation of 1 cent per mile on steam railroads? A few seem to expect serious results and state that as the electric lines have in many cases gone to considerable expense to handle this class of traffic, the government should recompense them for the revenues lost. Even if this low rate should become chargeable on interurban lines, however, there is no reason for fear.

Secretary McAdoo's steam-railway order reads: "All fares now constructed at a lower basis than 3 cents per mile shall be advanced to the basis of 3 cents per mile—subject to the following exceptions: (E) Officers, enlisted men and nurses of the United States Army, Navy and Marine Corps, when traveling in uniform at own expense, shall be granted the privilege of purchasing passage tickets at one-third regular one-way fare when on furloughs or official leave of absence, except that this reduced fare shall not be granted on short-term passes from camp or on liberty from ships or stations to near-by cities." Probably only 10 per cent of the service riders on the interurban lines are on furloughs or official leave of absence.

Thus the service revenues on interurban lines would be only slightly reduced by an application of the 1-cent rate to such carriers, and the loss would be negligible in view of the generally improving rate situation. The institution of the 3-cent steam railroad rate has given the interurbans an unparalleled opportunity to secure the rate structure which they need for their own and the nation's welfare. As the electric carriers find themselves enabled by increased rates to perform in full their essential functions, they will be doubly glad to give any aid desired for the boys of Uncle Sam.

First Aid to Electric Railways Is Needed at Once

THE one outstanding defect in the present system of utility regulation is *delay*. Electric railways are in straits, some are in the last throes. But they cannot, as a rule, get speedy relief.

A year ago the New York Public Service Commission, Second District, received petitions for relief from more than thirty companies. It was months before the first case was decided. Then the highest court in the State decided that the commission had not power to act, and an appeal had to be made to the separate municipalities. As a consequence, many of the companies have not yet had relief.

Nearly every application for increased rates results in long drawn out and expensive proceedings varied by all the political or legal moves for delay that ingenious politicians or lawyers can devise.

In Massachusetts the increased fare movement became marked as early as 1914. The utilities in that State have been under public control more than thirty years, so that all capital issues have had the approval of the authorities, and no question of "watered stock" can be raised. Yet the average time for disposal of the fifteen cases for higher fares instituted from Jan. 1, 1914, to May 24, 1917, was 144 days, varying from 36 to 379 days each.

The appeals made early in the present year by the Comptroller of the Currency, John Skelton Williams, and Secretary McAdoo, backed up by a letter from President Wilson himself, for *speedy assistance* to utilities and especially electric railways in the hour of need, as necessary to the war work of the government, may have had some effect somewhere, but they have not changed the record materially. The long battle in New Jersey over the emergency rate case of the Public Service Corporation still goes on, although this company's service in the war program is most marked.

A notable exception is the quick decision made by the Maine commission in the case of the Lewiston, Augusta & Waterville Street Railway, which applied for a 7-cent basic fare. This case was disposed of and the fares began to come in within thirty days.

Is it possible that the lesson of the experience of the steam railroads has not been learned? Years ago these carriers proved that not only did they need greater revenue but they needed it at once. Otherwise, new extensions, new terminals, new locomotives and cars could not be provided as they were needed for growing service.

When, last winter, we paid \$10 a ton or so for coal—double the rates prevailing when the railroads just asked for relief—we were paying only part of the enormous bill which that delay in granting higher rates brought about. The savings on freight and passenger rates were trifling compared to the extra cost of coal and countless other things which the lack of transportation facilities increased.

And now we must pay the increased rates anyway, for Mr. McAdoo has put them up probably to much higher figures than would have answered had the railroads been allowed to make the increase themselves. The politicians may have won a victory, but it is costing the public dearly.

The Bay State Street Railway in Massachusetts with nearly 1000 miles of track, by reason of insufficient income, was allowed to go into the hands of a receiver. Now not only are the fares higher, but more important, the receiver got permission of the courts to discontinue about 140 miles of track.

When the drowning man is hauled out on the bank, it is no time to wait for physicians' conventions. He needs first aid immediately. Questions of investment, fair return, valuation and the like, pertinent and proper as they may be when there is ample time in the regular procedure, should not be raised to delay action upon the present emergency applications of electric railways for immediate relief.

When higher wages must be paid—and that they should be paid admits generally of no argument—and the company's revenues will not meet the bill, the public must meet it at once or delay the war program at the cost of lives abroad. It is the same with advancing bills for coal and other materials, higher taxes and the like.

The questions of adequacy or excess payment of dividends and the like can be taken up at leisure. But now is no time, when these questions stand exactly as they have stood for years in most cases, to begin the long-detailed and time-killing study that such questions necessarily involve.

The government's War Labor Board has taken this ground. If local authorities and commissions cling to the policy of obstruction, the government by one means or another will have to clear the track, through exercise of its war powers. That its program will hardly result in so much hesitation over a 1-cent increase in the fare—or even more—is shown by the course taken with the steam railroads.

Applying the Lessons of the June Conventions in October

IN REGARD to its 1918 annual convention the American Electric Railway Association is fortunate in having the opportunity to study in advance a number of other war-time conventions. June is an important convention month for associations closely bordering on the electric railway field. The National Electric Light Association, the American Institute of Electrical Engineers, and the American Society for Testing Materials have held their usual conventions, and the Master Car Builders' Association and the American Railway Master Mechanics' Association held a short joint meeting of representative members to attend to necessary business.

In all of the June conventions the entertainment features were very properly subordinated to the idea of contributing to the winning of the war. This thought of the winning of the war was probably stressed more forcibly at the N. E. L. A. meeting than at the others, but it was evident in all of the programs of the associations mentioned. Every one of these represents an industry or a line of engineering activity which is vital to the success of our greatest of all national tasks. Power supply, transportation and first-class materials for all construction are certainly three of the most essential elements in putting up a winning fight. The test of the success of these meetings is the spirit in

which those who attended, as well as those affected by the reflected influence, go about their tasks after the conventions. If each is imbued with the conviction that all considerations must bend to the country's needs, then the expenditure in time and money of those who attended the conventions will have been justified, and only then.

In surveying as a whole the conventions held in June, these aspects stand out prominently. First it is not necessary or desirable to hold large conventions, as the needs of the hour can be met by a small, representative and earnest group qualified to lead the thinking of the industry which it represents. Second, in planning the program provision should be made for postponing, until after the war, all discussion which does not relate essentially to the means for winning. Third, the addresses and discussion should be unusually definite and concrete in their suggestions, leaving for peace times, if ever, those more diffuse and ephemeral dissertations which sound well but contain little of definite applicability.

As we said editorially some weeks ago, the spirit of these war-time conventions should be cumulative. We shall be greatly disappointed if our own convention in October does not show the result of careful study of the weak as well as the strong points in the meetings of our sister societies.

Justice Will Have Its Due in the Long Run

THAT the decision of the New York Court of Appeals in the Rochester fare case need not be discouraging to utilities seeking rate increases in other states is the cheerful conclusion which develops as one regulating body after another gives its views on jurisdiction over cases of this kind. Within the past few weeks we have had encouraging news from both Missouri and Pennsylvania on the fundamental point involved in the New York decision—the power of the State to alter franchise rates imposed under a constitutional requirement for municipal consent to electric railway construction and operation. It will be recalled that, owing to the defective state of the regulatory law in New York, the court there did not rule directly upon this constitutional question, although it uttered a dictum which has led many to fear that the State will not be able to change franchise rates without a constitutional amendment.

In the St. Louis fare case the Missouri commission decided that it has power to change franchise rates, and that whatever authority the city may have had to enact the ordinance in question it was necessarily adopted subject to the provisions of the Constitution that the charter and ordinances of the city conform always to the laws of the State. The commission held that the only harmonious interpretation of the constitutional consent clause in connection with other constitutional provisions relating to the police power and legislative control over rates gives the State the right to alter franchise rates when it so elects. Indeed, the commission stated in plain words that it does not agree with the dictum of the New York Court of Appeals.

The Pennsylvania commission in the recent Petroleum Telephone Company case expressed the sound principle

that adequate service cannot be rendered by a utility company unless it shall be permitted to charge such reasonable rates as will enable it to meet operating, maintenance and fair return obligations. The opinion said:

"While rates carried in municipal ordinances may be enforced so long as they remain reasonable and do not offend against other rate provisions of the public service law, whenever under changed conditions they become unreasonable, inadequate or unduly discriminatory, they place a burden upon the public from which the public has a right to be relieved, and the machinery for proper adjustment having been created, whereby the exercise of the police power may be put in motion, all ordinances carrying unjust or inadequate rate provisions must give way. We are of the opinion that such exercise of the police power of the State does not invade the authority of municipalities or violate the sanctity of ordinance contracts."

This decision, dealing as it did with telephone law, concerned primarily the supremacy of the State rate-making power over municipal consents required by statutory enactment and did not address itself directly to the question of control over rates fixed under a constitutional consent clause. In this connection, however, it may be pointed out that the Attorney General of Pennsylvania has now advised the commission of full power on its part to fix reasonable electric railway rates, notwithstanding the fact that such rates were specified by local authorities as a condition upon which they gave constitutional consent for the construction of the lines. This is a non-legalistic broad-minded interpretation of the law—such an opinion as the New York Court of Appeals should hand down when it comes to rule unmistakably on the constitutional point involved.

Another interesting recent decision in regard to State rate-making is that of the New Jersey Court of Errors and Appeals quoted in the June 22 issue of the *ELECTRIC RAILWAY JOURNAL*. It held in brief that the State sovereignty is still unimpaired, and that municipalities cannot exceed the authority intrusted to them and must not consider their powers extended even by implication. The question of a constitutional barrier did not arise, however, for the New Jersey constitution does not confer upon cities the right to grant street franchises, and the requirement for municipal consent was imposed by legislative acts. We mention the case here only because it is an excellent late example of what the New York Court of Appeals recognized when it said: "The paramount power of the Legislature over the subject of fares has been upheld in the absence of a constitutional limitation." And now, in view of the other opinions mentioned, is it too much to hope that the supremacy of the State power will eventually be recognized by all the courts without even such a qualification?

Utility companies must not despair because a court or commission here and there holds that it is without power to give relief in cases of this kind. Justice will have its due in the long run, and the real or imaginary barriers which stand in the way of adequate rates must give way eventually, even though laws have to be changed or constitutions amended. The fight for a square deal must go on.

The New South Wales Government Tramways

Australia's Greatest Electric Railway System Serves a Large Area and Provides Both City and Suburban Service—A Unique System of Route Signs, Easily Distinguishable from a Distance, Aids Particularly to Accelerate Traffic at Switch Points

SYDNEY, the metropolis of Australia, is justly proud of its electric railway system. The New South Wales Government Tramways, as this system is called, as the name implies is owned by the state and controlled directly by the Chief Commissioner for Railways and Tramways, James Fraser. A general idea of the extent of the system and the location of the various places served can be obtained from the accompanying map. Transportation is provided to the many beaches, race tracks, pleasure grounds, etc., as well as to all the suburbs to the south and east of the city. There is very little railway competition at these points. There are many different routes, thirty of which converge to Circular Quay, the port of Sydney. An idea of the heavy nature of the traffic may be gained from the fact that between 4000 and 5000 cars pass Railway Square, one of the busiest centers of the city, between 6 a.m. and midnight each day. The system comprises 350 miles of standard-gage (4 ft. 8½ in.) track in the city and suburbs and includes one or two isolated sections. The



MAP SHOWING TRAMWAYS AND RAILWAYS OF SYDNEY AND ENVIRONS

rolling stock equipment is composed of 1387 motor cars, eleven trailers and 105 service cars. These were all built locally except a few of the earlier ones built by the American Car Company. All are thoroughly serviceable and are provided with the most modern devices to give the passengers comfort, safety and a rapid means of transportation. As shown in the accompanying illustrations, the cars are of single deck construction and have the end section open while the center section is closed. In the latest type car used, side doors are provided for the closed section. In other types, entrance and exits are provided on each end of the closed section. Running boards are arranged along the sides for boarding and alighting. The latest type of car used is known as

the "O" class. Cars of this type are 44 ft. 5 in. long over all and 9 ft. wide over footboards. A seating capacity for eighty passengers is provided. The control equipment is Sprague-General Electric, type M, arranged for multiple-unit operation so the cars can be connected up in trains when desired. Other types of



CLASS "O" CAR HAVING ACCOMMODATION FOR EIGHTY PASSENGERS

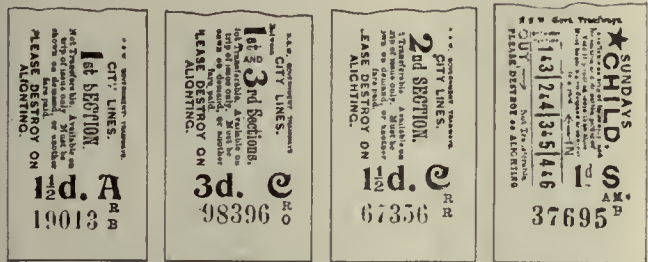


CLASS "L" CAR WITH ACCOMMODATION FOR FIFTY-SIX PASSENGERS

cars have K controllers and the remainder of the electrical equipment is General Electric. All cars are equipped with air brakes.

Destination signs are located just above the headlights at both the front and rear of all cars. In addition, side signs are provided at the edge of the roof. The end destination sign boxes, in addition to having the names of the various places served by the system, are provided with variously colored routing signs. These signs have geometrical figures of different colors which are visible from a considerable distance both day and night and enable the signal men properly to set the switches to give the car its proper route.

The following is a list of some of the forms in which these signs are arranged, and an idea as to their appearance can be obtained from the accompanying illustrations: White ground with one green circle; white ground with two red circles; white ground with two green circles; white ground with two green crosses; white ground with diagonal red cross; white ground with three green diamonds; white ground with green



TICKETS USED BY THE NEW SOUTH WALES GOVERNMENT TRAMWAYS

and red triangle; green ground with white diamond; green and white triangles; red and white diagonal bars.

Signal towers are provided adjacent to crossings and junctions. A Park Street signal box is shown in an accompanying illustration. The design is arranged to harmonize with the surroundings and presents an attractive appearance. The monogram of the railway system appears on each panel. The signaling and switching system is interlocking. An additional illustration shows the form of signal used. These consist of two separate disks with a red stripe on a white background. When the stripe is in a vertical position as shown in the signal numbered 6 in the illustration, the indication is clear, and when in a horizontal position, as in 7, it indicates stop.

The railway tracks, in general, are located on public thoroughfares, but there are some locations where the physical condition of the country makes it undesirable for the car lines to follow the public highways. This is especially necessary on the Spit-Manly section where the cars have to ascend and descend hundreds of feet from the sea level and "negotiate" the steep cliffs rising from the shores of the harbor. There is a section on the Balmain line where the track is so steep that it is necessary to use a dummy truck to pilot the cars up and down the steep inclines.

Power for operating the cars is supplied from a direct-current overhead trolley system with rail return at 600 volts potential. The system has three generating stations located at White Bay, Ultimo and Rushcutters Bay. There are also several substations situated at



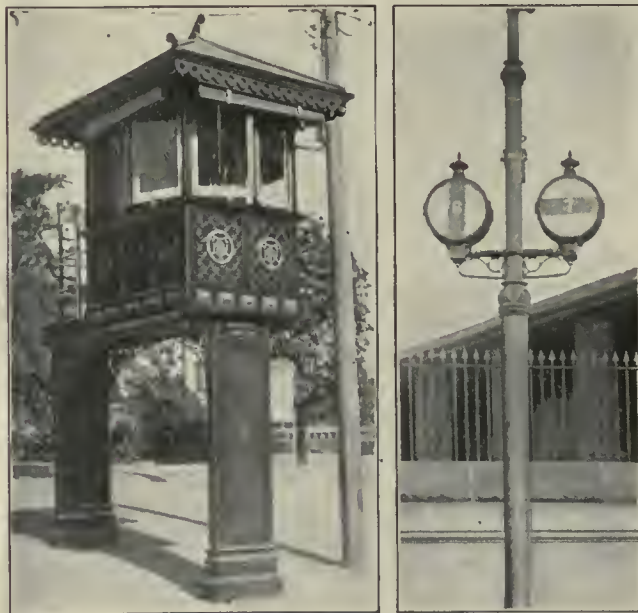
END VIEWS OF DIFFERENT CARS SHOWING LOCATIONS OF DESTINATION SIGNS

suitable points throughout the system. The location of these is indicated on the accompanying map.

In order properly to house and maintain the rolling stock, twelve carhouses are provided. The largest of these is located at the Dowling Street Depot, at which 700 men are employed. In addition an extensive construction and maintenance shop for the building and repair of rolling stock is located at Randwick.

The system of fare collection is based on the section or zone principle. The fares are moderate considering the service given. A section is from 1 to 2 miles long and the fare charge is 3 cents for a single section or at a rate of 2 cents per section where two or more sections are traveled. Each conductor is supplied with a ticket case to hold tickets of ten different denominations, as each section or combination of sections has its distinct colored ticket. Transfers are not used.

Several of the tickets are shown in an accompanying illustration. Some of the colors used are: for first section tickets, cerise; second, white; third, gray, etc. For tickets applying to more than one section, that for the first and second sections is green; first to third, sal-



PARK STREET SIGNAL BOX, NEW SOUTH WALES GOVERNMENT TRAMWAYS, AND TYPE OF SIGNALS USED

mon; second and third, light green; first to sixth section, blue, etc. Referring to the illustration, it will be noted that the fare is printed on each ticket and is indicated in pence as 2d, 3d, etc. The large letter immediately following the fare denotes the day of issue. A is used for Mondays and Thursdays, B for Tuesdays and Fridays, C for Wednesdays and Saturdays and S for Sundays and special fares. Underneath is the serial number of the ticket and immediately following are two letters. The topmost letter indicates the depot of origin—R for Rozelle, N for Newtown, AM for Enfield, etc. The lower letter denotes the series. Special rates of fare are provided for school pupils, teachers, members of the military and naval cadet forces, blind persons and apprentices. Special rates of fare are also provided for through transportation to the parks and race courses.

Some of the statistics regarding the operation of this railway system for the year ending June 30, 1917, are as follows: Passengers carried, 295,303,714; car mileage, 25,361,992; earnings, \$10,043,700 approximately; units of power generated, 94,326,199 kw.-hr.; men employed, 10,000. There are at present about 1000 men of the Tramway Traffic Branch in active service with the Australian Imperial Forces. At the Rozelle Depot a fine monument has been erected to the memory of fallen comrades and a similar memorial is in the course of erection at Dowling Street Depot. The cost of these monuments has been defrayed by the voluntary contributions of the staff.

Standing to the Colors at Jacksonville

A PATRIOTIC custom which appears to be original with Jacksonville, although it has since spread to other Florida towns, is standing to the colors for one minute at 6 p.m. every day. At that instant the flags throughout the city are lowered, and conductors in the standing cars announce: "Six o'clock—please bare your head and stand to the colors." This act is carried out by the passengers and by men on the shipyard ferries and elsewhere. The custom, which was first purely voluntary, has now been embodied in an ordinance of Jacksonville.

The Jacksonville Traction Company was glad to comply with this patriotic practice, but it found the power-house machinery less amenable. The first time the experiment was tried, the engines in the power station nearly ran away to their ruin. It was therefore decided to modify the plan by stopping different groups of cars within four minutes, as follows: Riverside and Highway cars stop at 5.58 p.m.; Phoenix Park, Main Street, West Bay Street cars at 6 p.m., and Fairfield, Lavilla and Newman cars at 6.02 p.m. This plan has worked out satisfactorily.

The shortage of men for electric railway work has been felt in Louisville. At one carhouse of the Louisville Railway where it has been the custom of the company to have about twenty-six extra men on hand there were recently only two extra men. The company has used various means to induce men to accept positions. The company has recently begun advertising in the newspapers of the county seat of every county in the State, seeking men between the ages of twenty-one and forty who are not in class 1 of the army draft.



AUSTRALIAN BUILT CAR AT PERTH

New Cars for Perth

THE Perth Government Tramways have recently put in service ten maximum traction double-ended cars of the type shown in the first engraving. They were built in the company's shop and are mounted on Brill-62-E trucks and equipped with GE-218-C motors. General Electric air brakes and Ohio Brass sanding valves are used.

As an experiment the company has also added two center-entrance cars, one of the Washington type, the other of the New York type. The Washington type car has four GE-58-A motors with K-36-J controllers without contactors. The doors are hand operated. The New York type car is mounted on Brill-62-E trucks and



NEW YORK TYPE OF CAR AT PERTH

equipped with GE-218-C motors with K-36-M controllers. The capacity is fifty passengers seated and twenty-two standing, and the car has carried ninety passengers. Both cars are fitted with Westinghouse air brakes. As prepayment operation is not used, the fare box apparatus has been removed. Both cars were built by the J. G. Brill Company.

The Perth Government Tramways system comprises about 36½ miles, measured in single track, and has been a government property since July, 1913. A new power station of 12,000-kw. capacity has recently been put in operation. Distribution in the city is at 6000 volts and to the outlying districts at 20,000 volts.



WASHINGTON TYPE OF CAR AT PERTH

Power Supply for Electric Railways

At Its Atlantic City Convention Last Week, the A.I.E.E. Discussed a Number of Topics Directly Applicable to Electric Railway Power Supply—Membership Is Now 9370

THE thirty-fourth annual convention of the American Institute of Electrical Engineers was held at Atlantic City last week with an attendance of about 200 members and guests. Abstracts of several of the papers were given in the June 29 issue of this paper, page 1229, and a number of others are abstracted this week. The convention was of the simplest possible nature, with few papers which could be considered without the sectional arrangement of the program sometimes found necessary and desirable by the Institute.

Retiring President E. W. Rice, Jr., in his presidential address, reviewed the progress recently made in the design of generating apparatus, after complimenting the Institute on the addition of 1235 members during the year, bringing the total to 9370. He said that the efficiency of electric generators is about 90 per cent and transformers 98 per cent, with no material change in three years. Water turbines have been improved, having a maximum efficiency now of 90 per cent. At the same time steam turbines have reached 75 to 80 per cent of Rankine efficiency, that is the percentage of the heat available within the working range of pressure and temperature. Thermal efficiencies have gone from 10 per cent to 21.6 per cent in fifteen years. Mr. Rice also referred to the progress that had been made in increasing "system" efficiency, *i. e.*, the energy efficiency of a system, and to the effects of operating substations automatically and of tying power plants together electrically.

In addition to the technical papers General William M. Black, Chief of Engineers, U.S.A., addressed the Institute on "Engineers and the War." Charles E. Stuart of the Fuel Administration also spoke, stating the attitude of the administration toward the utilities. This is that no drastic measures will be adopted in curtailing power generation until absolutely necessary, and every effort will be made to induce economy in the use of power. There is an acute shortage due to increased demand and decreased production.

A Bird's-eye View of Electric Transportation

The Coming of the Light-Weight Motor, the Electrification Situation and Other Matters Were Considered in the Traction and Transportation Committee's Report

THE annual report of the traction and transportation committee, signed by N. W. Storer, chairman, was chiefly concerned with heavy traction and light-weight motors. It called attention to the unprecedented operating difficulties of the past year. With labor conditions at their worst, the maximum tonnage ever offered, rolling stock and motive power sadly deteriorated due to a long period of lean income—all added to a winter of unprecedented severity, it is little wonder that the trunk lines practically collapsed under the strain. The

collapse of the steam railways, however, did not extend to electrified lines, especially to the electrified steam railways. These roads operated successfully through the hardest weather. The committee urged as a war measure the most careful consideration of the possibilities of electrification, both by the government and the railways, stating that electrification will eventually be adopted because the character of service will be so much better that the railways cannot afford to do otherwise. During the war, however, the amount of electrification work done will probably be limited to places where it is absolutely essential, or especially advantageous, in order to facilitate handling of traffic necessary for the proper prosecution of the war.

LIGHT-WEIGHT MOTOR HAS COME TO STAY

In electric railway circles, the past year has been one of great hardships. The long continued cold weather, combined with the heavy falls of snow, resulted in a very unusual number of break-downs with little opportunity for recuperation. First, the general labor and material situation made it difficult to secure good maintenance. In addition, the street railways have been working for several years under increasingly heavy financial difficulties, so that in many cases the equipments were in no condition to stand the extra strain.

A feature which contributed to this result was the light-weight campaign. Ten years ago there was great need for this campaign. The idea became prevalent that it costs a railway 5 cents per pound per annum to haul its equipment around, so that it has been the end and aim of practically every man having anything to do with the design of cars and equipment to cut the weight. This has been done in a more or less scientific manner, but like all campaigns of this kind, the pendulum has swung past the limit in some respects, probably due to the fact that it is impossible to recognize the limit until it has been passed and trouble encountered. Fortunately, such trouble has not been sufficiently widespread to do more than point to the limit.

Possibilities for trouble with light-weight motors are mainly as follows: (1) open ventilation, leading to the introduction of snow into the working parts of the motor, with resulting danger to insulation; (2) higher armature speeds, leading to more rapid deterioration of armatures and wear of bearings; (3) reduction of area of parts thus increasing unit stresses; (4) danger from overloading due to lack of sufficient thermal capacity to withstand abnormal loads.

The ventilated motor has come to stay. Its advantages are too many to give up because of the slight damage resulting from snow. The logical thing to do when there is danger from this is to put tight covers over the motor openings in the winter time. The additional margin due to the lower ambient temperature in

the winter will, in practically all cases, be sufficient to keep the motor temperature within safe limits.

High armature speeds should be approached with conservatism, care being taken that the armature is sufficiently substantial to withstand the additional strains, and that bearings are of liberal dimensions, with adequate lubrication.

The use of high-grade steel is recommended, but is preferred as an additional factor of safety, rather than to get minimum weight. It must be remembered that it is not always possible to secure special grades of material for making repairs.

Trouble from overloading with the light-weight motors has come as a very disagreeable surprise to operators. It is subject to careful analysis and the reasons are easily understood. The chief reason is that the limitations of the ventilated motor are not generally understood.

The trade has been educated to believe that the continuous rating of the railway motor is the one that determines its service capacity; and that if its continuous rating is equal to the integrated loads in service, it will be ample to perform the work. This method of selecting motors was quite satisfactory with the old non-ventilated type of motors, where the motor had sufficient thermal capacity to absorb the losses generated in the short applications of heavy loads, without reaching abnormal temperatures. The modern highly ventilated motor, however, has relatively a very high continuous rating, as compared with the one-hour rating. The latter, as is well known, is really the gage of the thermal capacity of the motor and of its capacity for handling heavy intermittent loads.

When the motor that is selected for its continuous rating is required to develop four times this load for a few minutes under some abnormal condition, a non-ventilated motor would be loaded to only about 60 per cent above its one-hour rating, while the highly ventilated motor would be loaded to two and one-half or three times its one-hour rating, resulting in a much greater rise in temperature. Where this abnormal load is applied at low speed, as is apt to be the case, the trouble is further accentuated, due to the decreased ventilation secured with fan-cooled motors.

The logic of this situation is simply that motors of the ventilated type for a given service will require a higher continuous rating than one of the non-ventilated type. Due regard must be paid to the capacity for short-time overloads in order to avoid reaching a dangerous temperature under abnormal conditions.

There seems to be a distinct tendency towards more conservative selection of equipments for street car service, since it has been definitely established that the cost of maintenance of motors which are worked beyond their capacity, added to the cost of unreliable service, is so high as to offset any possible saving resulting from the lighter weight. This is also leading to a return to four-motor equipments, simply because of their greater reliability under abnormal conditions. It is hoped, however, that any return along these lines will be taken with the greatest care and with the maximum utilization of the experience that has been secured up to date. Having been at both extremes, it should now be possible to adopt a mean position which will give the very best results.

Great savings in energy can be effected without cutting the weight of the equipment, by attention to improved methods of operation and, especially, by the further use of field control. It is hoped also that eventually it will be possible to make use of regenerative control for elevated and subway equipment, at least. This has worked out so satisfactorily on mountain grades that its extension to car equipment seems very desirable.

Experience with an Automatic Hydroelectric Power Plant

Seven Months' Operation of Cedar Rapids, Ia., Automatic Plant Has Demonstrated that Scheme Used Is Practical for Existing Local Conditions

SINCE October, 1917, there has been in operation at Cedar Rapids, Ia., the automatic hydroelectric plant of the Iowa Railway & Light Company. This plant is a further development of the automatic substation idea. Its construction and operation were covered in a paper at the Atlantic City meeting by J. M. Drabelle and L. B. Bonnett, the former of the Iowa Railway & Light Company and the latter of the General Electric Company. This plant was fully described in the issue of the *ELECTRIC RAILWAY JOURNAL* for Dec. 1, 1917, page 980, and its salient features were emphasized in an editorial on page 978 of the same issue. Supplementing the earlier article the following notes are based on the paper by Messrs. Drabelle and Bonnett, to indicate the results of the last winter's experience with the plant.

When the paper was written the station had been in operation about seven months, and during this time the total flow of the river had been used at all times. The plant had fed into the transmission system a total of about 3,000,000 kw.-hr. There were a few failures to start, as no automatic apparatus can be absolutely infallible, but the source of the failures has been found and removed.

The equipment is designed to shut down in case of abnormal conditions, so that all the machines will be protected against injury. It operated so successfully that, in spite of the shortage of help and pressure of other work on the part of those in charge, the plant ran continuously for ten weeks with no attention of any kind to the automatic equipment. There have been several cases of exciter trouble at the main steam station, resulting in a complete shutdown of the automatic plant. As soon as the bus voltage was restored the automatic equipment put the hydroelectric plant back onto the line without attention of any kind and with no damage to any machines.

Since the plant was put into operation the changes that have been made consist essentially of substituting heavier and more reliable relays at one or two points in the control system. The plant has successfully withstood short-circuits, exciter failures in the steam plant, low and high water, and all of the test conditions which those in charge of the work desired to place upon it, without damage. Incorrect operations have been brought about artificially, further to test the plant, and it has been operated by the regular operating force of the steam plant. There has been no occasion to keep men in the hydroelectric plant to watch its operation.

In concluding their article the authors point out that if the automatic development means anything at all it will now be possible to develop a large number of small, low-head plants and to tie them in on a high-tension system, leaving their operation entirely to the float switch and voltage relays. If there is voltage on all three phases of the high-tension line and water for the turbines, they will start up and go onto the line without wrecking themselves or disturbing the operation of the remainder of the system. In these days of scarcity of coal and of labor, together with high prices for these, the utilization of our water power is of national importance. With the elimination of the excessive cost of labor for small plant operation, many water-power sites can be made paying investments.

Keeping Direct-Current Apparatus from Flashing

High Speed Circuit Breakers and Arc Barriers Have Been Proved Effective in Limiting the Effects of Short-Circuits

THE latest practice in protecting d.c. equipment from flashing was described in a paper by J. J. Linebaugh and J. L. Burnham, both of the General Electric Company, Schenectady, N. Y. The subject is of particular importance at this time on account of the flashing problems incident to the automatic substation and to high-voltage heavy traction. As the authors point out, the problem of protection from flashing has for many years confronted engineers who build and operate d.c. machines. Some form of bar-

coils short-circuited by the brush as each segment of the commutator passes from under the brush. The spark or arc tends to hold, due to the inductive character of the coil, and if the arc is of sufficient volume the vapor produced thereby forms a low-resistance path between segments and from brush to brush or to frame. The value of load that causes flashing when applied suddenly, *i. e.*, short-circuit, is a function of the time required to throw it off. The quicker the circuit is opened the higher the value of current that will not cause arcing.

With the ordinary circuit breaker which begins to open at about one-quarter of a second there is a certain maximum load which cannot be exceeded for each commutating machine without causing flashing. If feeders have a sufficient resistance to limit the short-circuit current to this critical value, flashing will occur only on the rare occasion of a short-circuit in a feeder itself. It has been the standard practice of nearly all manufacturers to recommend the tapping of feeders, especially railway feeders, at a sufficient distance from the substation to insure enough resistance in the circuit to limit current in case of short-circuit near the station.

With special high-speed circuit-opening devices, operating at about 0.005 second, the more sensitive machines, such as 60-cycle synchronous converters for railway voltages, may be short-circuited without flashing over even though the maximum current is of higher value than would cause flashing with suddenly applied load in ordinary circuit-breaker operation.

After considerable experimentation the engineers of the General Electric Company decided to concentrate

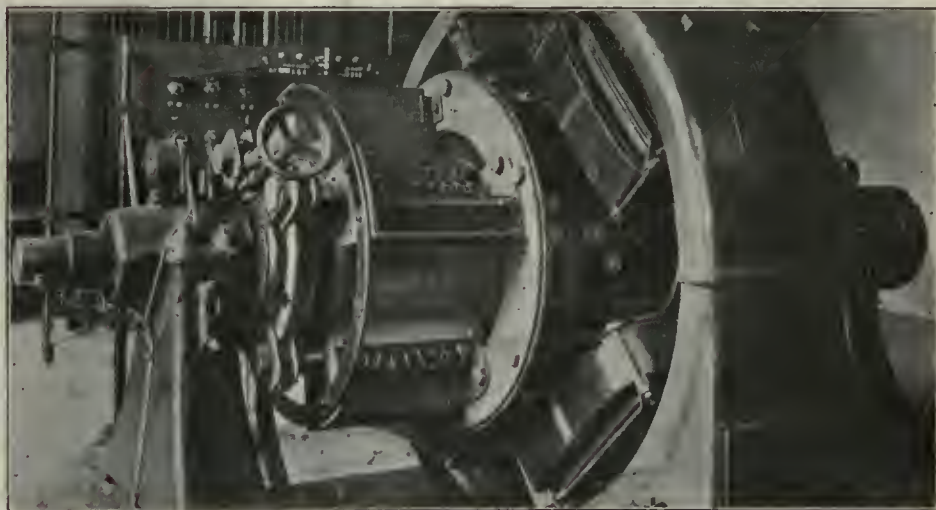


FIG. 1—FLASH BARRIER INSTALLED ON 2000-KW., 3000-VOLT, SYNCHRONOUS MOTOR-GENERATOR SET USED IN CONNECTION WITH HIGH-SPEED CIRCUIT BREAKERS. FIG. 2—500-KW., 25-CYCLE, 600-VOLT SYNCHRONOUS CONVERTER EQUIPPED WITH COMMERCIAL FORM OF FLASH BARRIER INSTALLED IN AUTOMATIC SUBSTATION

rier has been the most common protection suggested, but most attempts to apply this plan have been unsuccessful. It was realized, also, that the means for preventing flashing at the commutator and brushes of d.c. machines must operate to remove the cause very quickly. In this paper a special form of barrier which gives the required protection, and two forms of high-speed circuit breakers were described.

A flash at the commutator starts from excessive sparking, produced by the breaking of current in the

their energies on the design of a circuit breaker using the principle of a latch, a heavy spring and a series tripping coil. The problem was to obtain very quick tripping, rapid acceleration of contact and a sufficient number of ampere-turns in the magnetic blow-out to insure rapid breaking of the arc. A very special latch with a light tripping movement was designed somewhat similar to the hair trigger on a rifle, so that about 0.001 in. movement of the plunger would trip the breaker.

A breaker of this type was tested exhaustively in connection with a 2000-kw., 3000-volt d.c. synchronous motor-generator set built for the Chicago, Milwaukee & St. Paul electrification, and some have been in service in the substations of this railroad since early in 1917.

Later another type of high-speed breaker has been developed and forms part of the more recent equipment being furnished to the St. Paul. This consists essentially of a contactor having a laminated structure with electric holding coil and series bucking coil so that it opens when the load current reaches a value sufficient to offset the ampere-turns of the holding coil.

ARC BARRIERS ARE NECESSARY ALSO

In connection with the tests described it was found that even with the very high speed obtained it was not possible completely to protect the machines from flashing on the most severe short-circuits, and barriers were designed and installed to supplement the circuit break-



FIG. 3—FLASH BARRIER WITH FRONT REMOVED TO SHOW LOCATION AND CONSTRUCTION OF ARC SCOOP AND WIRE MESH ARC COOLERS

ers. Barriers of the type shown in Fig. 1 were installed to delay the time of flashover so that the breaker could give complete protection.

Further experimenting resulted in the general arrangement of a successful barrier as shown in Fig. 2. Here a close-fitting box of fireproof insulating material surrounds each set of brushes and is located so as to give a small clearance between the box and the commutator. On the side of the box toward which the commutator rotates after leaving the brush is fastened a V-shaped "scoop" (see Fig. 3) of fireproof insulating material, preferably having good heat conductivity. This points toward the brush and has a small running clearance from the commutator. Radially above the scoop about 1 in. apart are two metal screens, one coarse and one fine mesh, through which the arc is successively forced and cooled.

The scoop runs very close to the commutator with narrow edge and small clearance and picks up the arc from the commutator and deflects it into the arc coolers which, from their construction, allow free passage of all gases generated by the arc. The cooling and con-

densing of the arc reduces the gas pressure so that shields at the end of the commutator, installed to prevent the arc from being thrown from the end of the commutator and communicated to the pillar block and frame, are permissible.

Direct-current machines for use in automatic substations are being equipped with these barriers and short concerted tests at the substations have been taken, indicating that they will take care of any short-circuit experienced in actual service. These barriers are in operation and short-circuit tests were taken on a 500-kw., 600-volt, 25-cycle synchronous converter of the Des Moines Electric Railway; a 500-kw., 600-volt, 60-cycle synchronous converter of the Columbus Electric Railway & Light Company, Columbus, Ohio, and a 500-kw., 30-cycle, 1200-volt synchronous converter at Monticeth Junction, Mich., and other installations are now in service.

The investigations and tests indicate that if any commutating machine is equipped with barriers and the last high-speed circuit breaker described, complete protection will be given against external short-circuits of all kinds so that interruptions to service will not be of any greater duration than necessary for closing the circuit breaker as in ordinary overload operation.

DISCUSSION ON ANTI-FLASHING APPARATUS

The paper of Messrs. Linebaugh and Burnham brought out some interesting discussion. One speaker referred to methods developed by the Interborough Rapid Transit Company to prevent flashover. In one case a condenser was connected in series with the trip magnet so that the latter would be actuated when there was an instantaneous drop in voltage. He emphasized the disadvantages of a high-speed breaker stating that it is easier to use a choke coil with the trip coil shunted across it. With this arrangement the switch will open when there is an impulse voltage impressed.

Another speaker commended the method described by the authors as logical in supplementing existing apparatus. He mentioned another method of attacking the problem, consisting of the short-circuiting of the windings of the machine through collector rings to reduce the voltage below the flashover point and at the same time to reduce the field flux. (See *ELECTRIC RAILWAY JOURNAL*, May 4, 1918, page 858.) Attention was also directed to the disadvantages of barriers in that the commutator and brushes are rendered inaccessible thereby.

Large Diameter Trolley Wheels Give Good Results

The Oakland, Antioch & Eastern Railway is reported to be enjoying continued success with various makes of 10-in. trolley wheels originated by this company and described in an article by F. A. Miller in the *ELECTRIC RAILWAY JOURNAL* of Aug. 14, 1916, page 278. With a 6-in. wheel previously used, the limit of life was frequently as low as 90 miles with a trolley pole tension of 35 to 40 lb. With the 10-in. wheels it was found that the tension could be reduced to from 25 to 30 lb. and the life of these wheels with this reduced tension was increased to 6000 miles and more. Wheel dewirements and pole troubles were also greatly decreased.

Employees Demand Wage of 60 Cents an Hour

In Leading Cases Before War Labor Board Union Representatives Give Their Idea of a Reasonable Wage—Want Platform Time of Nine to Ten Hours Performed in Eleven to Thirteen Hours, With Time and a Half for Overtime—Cleveland Railway Says Demands Are Excessive

THAT 60 cents an hour is a reasonable wage for electric railway trainmen is the contention advanced by union representatives in leading cases now pending before the War Labor Board. Data to this effect were introduced by brief and by witnesses before the board at the hearings which began on Monday, June 24, in Washington, D. C.

It will be recalled that upon the opening of the hearings the joint chairmen, William H. Taft and Frank P. Walsh, stated that the board wished to hear arguments upon two points: (1) What recognition should the board, in making wage awards, give to the financial status of the companies? (2) What is a living wage? As described in detail in the *ELECTRIC RAILWAY JOURNAL* of June 29, the arguments on the first point during the week seemed to impress the chairmen with the fact that although it is the duty of the board to fix reasonable wages, despite the poor financial condition of utilities, any awards made should be accompanied by a recommendation for fare increases by federal action in order to prevent the awards from being nullified and maximum production from being injured.

When this point became established, and as the railway men and union representatives were drawing up a mutually satisfactory brief holding that both Congress and the President have power to increase electric railway fares without assuming further control of the properties, the attention of the board was turned to the second question—that of a living wage. Some evidence and briefs were then presented, from which one can secure a good idea of the general propositions being advanced before the board.

The board announced that in order to expedite proceedings and not cumber up the records, it would consider as evidence in any of the twenty-four cases before it the relevant and material evidence in any of the other cases. The companies to make arguments after the general railway case was completed were asked, therefore, to confine their attention to local conditions. Inasmuch as most of the railway men had come prepared to discuss the point of wages only in connection with their individual cases, not much general evidence was introduced by the carriers. The Detroit and Cleveland companies, however, presented arguments on their cases, and the Chicago Surface Lines, the Chicago Elevated Railways and the Public Service Corporation of New Jersey were given a short extension of time to prepare evidence in detail.

ISSUES RAISED IN CLEVELAND AND DETROIT

According to the union brief, the principal points in controversy in Cleveland and Detroit include schedules,

wages and overtime. In the men's opinion, schedules and overtime are so interwoven with wages that unless both are satisfactorily fixed an award of a substantial increase in wages could be made ineffective by operation within excessive outside time and with improper pay for overtime.

At present the wages in Detroit are 30 cents an hour for the first three months of service, 35 cents an hour for the next nine months and 40 cents an hour thereafter. In Cleveland the present wages are 32 cents an hour for the first year and 35 cents an hour thereafter. The request of both the Detroit and Cleveland organizations is for a wage rate of 60 cents an hour. It has been agreed that the Cleveland award by the War Labor Board shall be effective as of May 1, 1918, and that for Detroit as of June 1, 1918.

LIMIT DESIRED FOR OUTSIDE TIME

The employees in Cleveland and Detroit, it is said, are not seeking a shorter work day, although various public bodies are decreeing a basic eight-hour day. The men are willing to work for a longer period "as that is the only way they see of obtaining an adequate weekly wage." In their opinion, however, the runs should be so arranged that the platform time would be from nine to ten hours performed as follows: 40 per cent of the runs within eleven hours; 40 per cent within eleven to twelve hours, and 20 per cent within twelve to thirteen hours—with, of course, the understanding that each 40 per cent would be considered a minimum and the 20 per cent a maximum.

To show the board that this proposition is practical, the men quoted from agreements between these Massachusetts companies and their employees as follows:

Boston Elevated Railway:

At least 70 per cent of all schedule runs are to be within eleven hours, and in no case is a schedule run to have outside time in excess of fourteen hours.

Bay State Street Railway:

In the arrangement of schedules as many runs as possible shall be made nine hours to be completed within eleven consecutive hours, consistent with the remainder being arranged to the best advantage in runs of not less than eight or more than nine and one-half hours, to be completed within twelve consecutive hours, except that not more than 20 per cent of the total runs may exceed twelve but not fourteen consecutive hours.

Springfield Street Railway:

Worcester Consolidated Street Railway:

Not less than 60 per cent of the schedule runs shall be not more than nine hours work, and shall be so arranged that not less than one-third thereof shall be completed within eleven consecutive hours, and not more than one-third thereof shall be completed within twelve consecutive hours, and that the remainder thereof shall be completed within eleven and one-half consecutive hours. Not more than 40

per cent of the schedule runs may be, but shall not exceed, nine and one-half hours' work, and shall be so arranged that not less than one-half thereof shall be completed within eleven consecutive hours, and not more than one-half thereof shall be completed within twelve consecutive hours.

James H. Vahey, counsel Amalgamated Association of Street & Electric Railway Employees, stated that when a man started to work at 5 a.m. he ought to finish work at least in the middle of the afternoon. The men must submit to hardships necessary to the business, but the outside hours should be as short as possible in order that the men may be enabled to get rest and recreation.

The union leaders also called attention to the decision of Justice Higgins of the Australian Commonwealth Arbitration Court (6 Com. Arb. 168). Justice Higgins fixed eight platform hours a day to be performed within nine consecutive hours. He went further and fixed a week of only six working days, with provision that "the overtime for any excess of forty-eight hours

Owl-car runs should be straight with no more than eight hours' time to pay the full ten hours' time allowed to other employees.

COST OF LIVING UP 42 PER CENT

In taking up the wage question itself, the Detroit and Cleveland brief presented as a basis the following summary of the rise in the cost of living for the last two years:

	Per Cent Increase	Weight	Product
Food.....	52	43.47	2,260
Rent.....	20	15.25	305
Clothing.....	53	13.02	690
Fuel and light.....	31	5.69	176
Sundries.....	35	22.57	790
Total weighted increase, 42.21 per cent.			4,221

In commenting upon this table the brief states that the Railroad Wage Commission decided to adopt a fig-

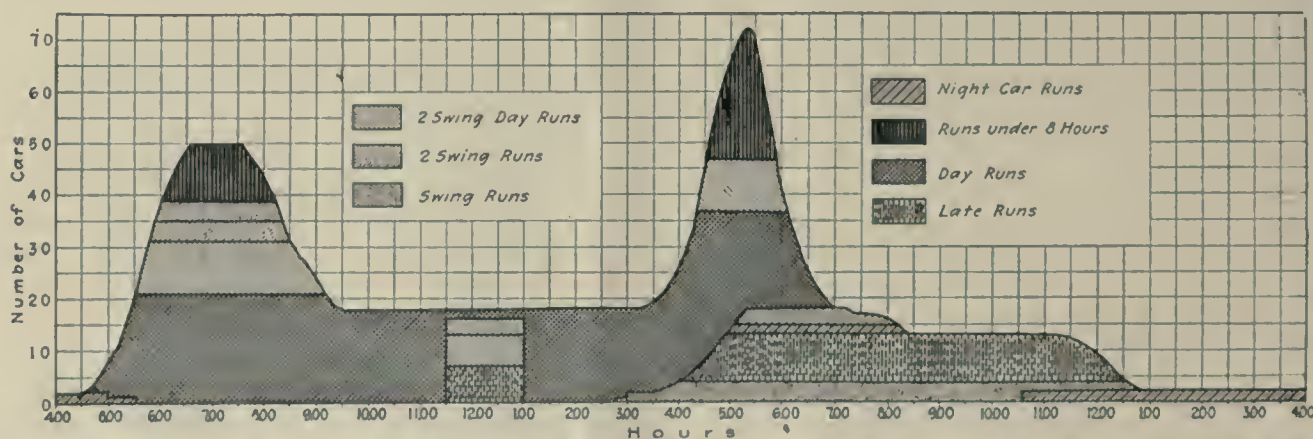


DIAGRAM NO. 2—CLASSIFICATION OF RUNS ON TYPICAL CLEVELAND LINE UNDER PROPOSED WORKING CONDITIONS

shall be calculated at time and a quarter for the first two hours, and at time and a half afterward." This overtime rate of time and a half applied to all time on Sundays and holidays.

CLEVELAND PROVISION OF TIME AND A HALF FOR OVERTIME IS DEMANDED

The employees in Detroit are asking the War Labor Board to make the same overtime provision as already exists in Cleveland, namely:

All motormen or conductors who are called upon to work extra trips or do other extra work in addition to the runs to which they are respectively assigned, shall be paid time and a half for all such time, and time and a half from the completion of their run to the starting time of the extra trip or extra work. Where a run has a swing of one hour or less, the motorman and conductor working such run shall be paid for such swings. (This does not apply to relief for dinner on two-swing runs.)

In general, the employees allege, the trades such as machinist, carpenter, painter and the like have a basic day which is usually only eight hours long, and then receive double time for all overtime. Electric railway employees are asking only time and a half after a day's work of from nine to ten hours. Extra pay for overtime, it is said, is the logical way to force the standard day of reasonable hours with no work thereafter.

As for Sunday and holiday work, the Detroit and Cleveland men ask that it be established on a basis of not to exceed eight hours straight time in one day.

ure of from 37 per cent to 38 per cent as representing the rise in the cost of living for the United States as a whole for the two-year period from January, 1916, to January, 1918. It would, however, be natural now to expect a higher increase for the following reasons:

1. The period used in the table is from May to May. In this period a greater increase took place in all the items (particularly clothing) with the exception of food.

2. The figure for rent increase was taken by the Railroad Wage Commission at 10 per cent, which was the average they found for the country as a whole.

They found the increase in what they called the "Eastern Territory," however, to be 15 per cent.

3. What figures could be obtained on rentals in Detroit and Cleveland show that the figure for rent increase for those two cities is too low.

4. In the words of the Railroad Wage Commission, the figure for the increase in clothing is low.

With regard to a minimum wage expressed in dollars, the employees cited the finding of Dr. Chapin, professor of economics Beloit College, to the effect that an income of \$900 or more properly permits "the maintenance of a normal standard at least as far as the physical man is concerned." Since his investigation in 1907, however, the cost of living has advanced about 75 per cent, which would give a living minimum wage of \$1,575 upon the same standard of living.

The desired hourly rate of 60 cents would give the following yearly incomes:

Eight hours per day; 300 days per year; income of.....	\$1,440
Eight hours per day; 325 days per year; income of.....	1,560
Nine hours per day; 300 days per year; income of.....	1,620
Nine hours per day; 325 days per year; income of.....	1,765
Ten hours per day; 300 days per year; income of.....	1,800
Ten hours per day; 325 days per year; income of.....	1,950

Thus, the employees state, at a rate of 60 cents an hour a man would have to work at least nine hours a day for 300 days a year in order to earn a wage of \$1,620 and save \$45 above the \$1,575 cost of living. If he wished to save more, as he should do, he would have to work either more days a year, or else more hours a day.

Applying the increase in the cost of living during the last two years to the wage rates received by the men in 1916 gives the following results (only the maximum rates being considered):

	Wages in 1916	Increase	Result
Cleveland	34 cents	42%	48½ cents
Detroit.....	35 cents	42%	49½ cents

If 5 cents is added for compensation for past hardships and another 5 cents for the increase expected during the coming year, the wage rate of 60 cents an hour, in the men's opinion, then shows itself to be fair and reasonable. Moreover, this rate is asserted to

Upon the basis of the increased cost of specified items of expenditure in 1911, 1914 and 1917, as compared with the cost as ascertained for 1900 by the Bureau of Labor Statistics, the records for families with incomes of \$1,000 and under \$1,100 would be:

	1900	1911	1914	1917
(340 Families—Nine Months)				
Food.....	\$349	\$457	\$509	\$764
Clothing.....	136	151	152	264
Rent.....	158	211	209	251
Fuel and lighting.....	44	44	50	90
Sundries.....	213	243	239	315
Total.....	\$900	\$1,106	\$1,159	\$1,684
Increase in 1917 over 1911, 52 per cent.; over 1914, 45 per cent.				

The average wage of the men involved in Chicago, it is said, is about \$90 per month or \$1,080 per year, and the comparison shows that it will take \$1,684 a year to cover the present living cost on the basis of the 1900 standard. This result is close to the figure of the Bankers Trust Company arising from a 50.9 per cent increase. Moreover, it is added, the April *Monthly Review* of the Bureau of Labor Statistics reports the average family budget for twenty-four principal cities in this country to be \$1,650.

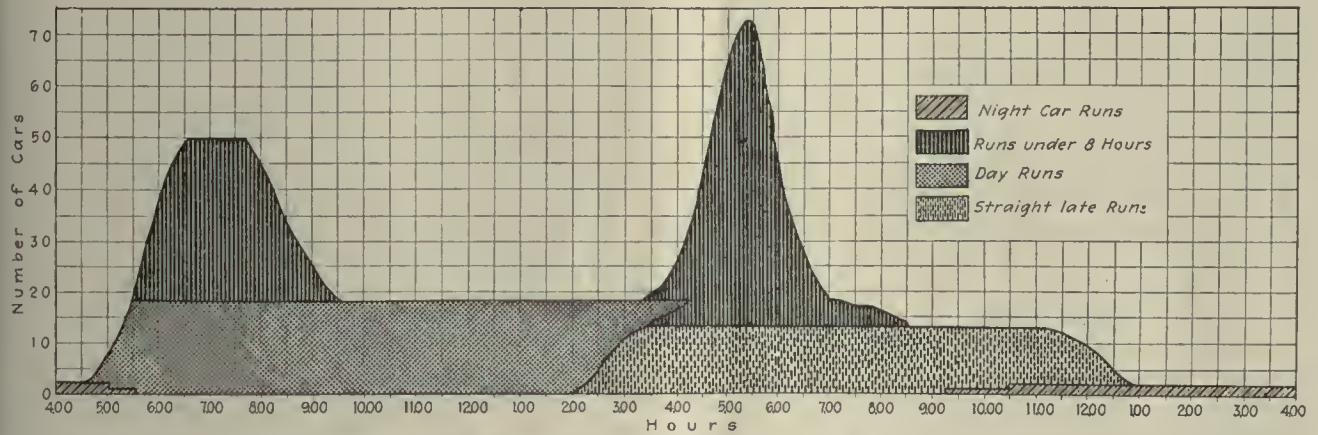


DIAGRAM NO. 2—CLASSIFICATION OF RUNS ON TYPICAL CLEVELAND LINE UNDER PROPOSED WORKING CONDITIONS

be below the going rate for skilled labor, in which class the employees place themselves because of their exercise of skill and assumption of responsibility.

SPECIAL DATA ABOUT CHICAGO

From the brief filed by the union men in the cases of the Chicago Surface Lines and the Chicago Elevated Railways it appears that the surface trainmen are receiving from 30 cents an hour for the first three months up to 39 cents an hour for the fifth year and thereafter; the elevated motormen, 41 cents an hour; the elevated conductors 34 cents an hour and the guards 31 cents an hour.

On the basis of tables prepared by the Bankers Trust Company, New York, to show the proper percentage of the salary of employees to be paid as a bonus to offset the increased cost of living, it is said that the surface and elevated employees who are receiving from \$900 to \$1,199 are entitled to an increase of from 50.2 per cent to 50.9 per cent, while those receiving less than \$900 are entitled to a raise of more than 48.4 per cent. This, it is stated, does not take into consideration the increase in the cost of living since December, 1917.

In the course of the hearings John Fitzpatrick, of the Chicago Federation of Labor, stated that the general rate of wages specified for 1917 in the building trades of Chicago was 70 cents an hour; for 1918 the rate has been increased to 80 cents with one or two exceptions. In his opinion, this gives the closest basis for considering the rate of wages which should apply to electric railway operation in Chicago. Mr. Fitzpatrick said that the pauper budget established by the United Charities of Chicago was \$1,000 for a family of five. Provision for insurance and other necessary items not included would increase this amount by \$108. Even the pauper budget itself, however, would require a wage rate of 46 cents an hour.

CLEVELAND RAILWAY PROTESTS AGAINST EXCESSIVE INCREASE

The Cleveland Railway, as noted in last week's issue, concedes that its employees are entitled to an increase in wages because of the sudden and unexpected rise in the cost of living, but it can find no excuse for the men demanding a raise to 60 cents an hour, or 71 per cent, at this time. Motormen and conductors are not skilled employees, in the sense in which the

term "skillful" is commonly used, for only a few days' training is needed to enable one to perform the duties. The work is not difficult—it is, in fact, much easier than almost any other unskilled employment. On the other hand, the work is attractive and continuous, not being affected by weather conditions as are the building and many other trades.

At the suggestion of the War Labor Board the Cleveland Railway collected the data shown in the accompanying table bearing upon the wages paid and increases made in other lines of employment. This table shows that the railway, between March 1, 1910, when it resumed the operation of its railroad after the receivership, and May 1, 1917, when its last wage agreement with its motormen and conductors was made, advanced wages 41 per cent, while the average increase in the other occupations, including the advances of June 1,

COMPARATIVE WAGES AND INCREASES IN CLEVELAND

Employment	Cents per Hour 1910	1918	Per Cent Increase
Electric railway men	24	35	41.0
Bricklayers	60	90	50.0
Iron-workers	60	90	50.0
Lathers	56½	85	51.1
Plumbers	56½	81½	43.8
Steamfitters	56½	81½	44.4
Carpenters	45	80	77.8
Lifting engineers	45	85-90	88.9-100
Building laborers	25-35	55	57.1-120
Pipefitters	45	70	55.5
Painters	42½	67½	58.8
Stonecutters	56½	77½	37.8
Average	48.29	77.50	60.49

1918, has been 60 per cent. An advance of 60 per cent to trainmen over the average wage of 24 cents an hour that they were receiving in 1910 before the company resumed possession of its property would bring the average wage now to 38.4 cents. The same advance over the average wage paid June 1, 1910 (25 cents an hour), would give them now 40 cents.

If the same increase in wages were granted to the employees of the Cleveland Railway, as was recently allowed to the steam railroad men, conductors and motormen who on Dec. 31, 1915, received 29 cents an hour would be raised to 41 cents an hour, and those who then received 32 cents an hour, the maximum then paid, would be advanced to 45½ cents an hour. The company believes, however, that a smaller advance should be made to its trainmen than to steam railroad men.

Bradstreet's "Weekly Food Index" for each week of this year and each corresponding week of 1917, indicates an average advance in the prices of thirty-one foods of less than 20 per cent over last year. It indicates also a gradual decrease in rise in prices since the beginning of 1918. The percentage increase of 35.34 for the first week in January, 1918, as compared to the same week in 1917, has gradually dropped to 8.61 for the last week reported in June.

In the matter of changes in working conditions, the Cleveland Railway objects that several hundred more men would be required to follow out the men's demands. It is even now difficult to find enough men to operate the railway properly.

Diagram No. 1 shows the number of cars necessary to give the service required by the city on a typical line and the present arrangement of runs to operate these cars. Diagram No. 2 shows the same line, with

the runs rearranged as proposed by the union. Comparison of the two shows the enormous increase in the number of short runs and in men required.

The total number of men now working eight hours is 1951. Under the proposed scale the number of men working eight hours would be 1385; that is, 566 men who are now working eight hours would have to be satisfied, under the proposed arrangement, with something less than eight hours. The total number of men now working less than eight hours is 423, which number, under the proposed schedule, would be increased to 1844. That is to say, 1421 additional men would be required to work less than eight hours.

The number of men now operating three typical lines is 350. The proposed arrangement would require 476 men to do the same amount of work. For the entire system 2374 men are required to operate the present schedule. Under the new arrangement 855 additional men would be required—an increase of 36 per cent—to operate the same number of car-miles.

Under the present arrangement, the company has now a five-hour minimum; that is, a man is paid for at least five hours if he works at all. At present the company is required to pay each year for 179,819 hours for which it has received no service. The proposed arrangement of runs would increase this "dead" time to 462,134 hours a year, for which the company would be required to pay the full wage without receiving any service. At the present wages this would require an expenditure of \$161,746. If the maximum demand as to wages were granted, it would cost the company \$277,280 a year for "dead" time alone.

During the hearings F. H. McCulloch, Evanston, Ill., testified that the 10-mile Evanston Railway is paying 38 cents an hour, or about \$120 a month. The policemen, firemen, drivers of coal trucks, drivers of milk wagons and all men performing service similar to that of electric railway men are receiving at least 20 per cent less. The company has more applicants than it can take into service. Small lines of this sort should not be overlooked in the general wage discussion.

CURRENT OPINION IN WASHINGTON

Newspaper reports that the War Labor Board will hand down its wage decisions in the near future are not subject to confirmation in Washington. It is stated to the Washington correspondent of the ELECTRIC RAILWAY JOURNAL at the office of the board that there are so many reports and briefs still to be considered that some time may elapse before decisions are reached. Mr. Taft has taken much of the material to his summer cottage at Murray Bay, Canada, where he purposes to work further before decisions are announced.

In official as well as electric railway circles in Washington it is believed that President Wilson will soon appoint an electric railway administrator because of the necessity of giving assistance under a strong guiding hand to the electric railway industry as a war measure. The appointment may be made at any moment. On the other hand, there may be a delay because of the continued absence of the Director General of Railroads from the city. There is a disposition in official circles to doubt recent newspaper reports that Peter Witt, Cleveland, will be the appointee.

Five Cent-Seven Cent Fares for Pittsburgh

An Analysis of Conditions Shows This to Be the Most Equitable Arrangement — Outbound Passengers Pay as They Leave, While Inbound Passengers Pay as They Enter

ON JUNE 20 the Pittsburgh Railways superseded the former 5½-cent fare which has been in effect since Jan. 22 last by inaugurating a 5 cent-7 cent fare. This is a combination of a flat rate and a zone system and is believed to combine the good points of each class of rates.

The 5½-cent fare placed in effect last January included the use of tickets sold either two for 11 cents, or ten for 55 cents. If a cash fare was paid the amount was 6 cents, and if a dime was given and pennies were not available for change, a 4-cent rebate coupon was given. This system was explained in the ELECTRIC RAILWAY JOURNAL of Feb. 9, page 278.

During the past months the majority of the car riders have availed themselves of the 5½-cent fare by purchasing tickets, but the greater number bought the two-for-11-cents tickets instead of the longer strips, in spite of the fact that they used the cars every day. The sale of tickets in such small quantities was found to cause great inconvenience to the conductors.

The number of persons traveling on the cars has decreased about 8 per cent during the past four months as compared to the same period last year. The company attributes this decrease in part to the large number of young men who have gone into military service and who were formerly in the habit of using the cars, especially in the evening; in part to the natural instinct of persons to economize during this time of necessary sacrifice, and, in part, but of less importance than the other factors, to the ½-cent increase in fare. In consequence of this decrease in travel, the increase



CENTRAL AREA REPRESENTS PITTSBURGH'S 5-CENT ZONE. TO RIDE IN OUTSIDE AREA FARE IS 7 CENTS AND BEYOND SECOND LINE ANOTHER 7 CENTS

in revenue resulting from the 5½-cent fare has been little more than 2 per cent. It therefore became necessary to obtain a further increase in fares, and various methods were proposed and analyzed. It was determined that it would take at least 7 cents, if a uniform fare was charged, to insure proper street car service.

The inequalities of a flat fare have been appreciated by the railway industry from time immemorial. The Pittsburgh Railways analyzed one of its typical lines to determine the extent of this discrimination. It was found that based on the car-miles and passenger-miles per day in each 1-mile zone between Pittsburgh and Wilkesburg the amount of fare that would be paid at the average rate of fare then in effect, if each passenger paid according to the distance he rode and according to the number of passengers on the car in each mile zone, would be as follows:

First mile	1.49 cents
Second mile	1.50 cents
Third mile	1.60 cents
Fourth mile	1.63 cents
Fifth mile	1.75 cents
Sixth mile	2.15 cents
Seventh mile	3.99 cents
Last ¾ mile.....	6.60 cents

In place of this, however, the man riding 1 mile and supposedly entitled to a rate of 1.49 cents was paying for the passenger who rode the longer distance. On the other hand, a true zone system was considered impracticable for a city the size of Pittsburgh.



DIVISION No. 1—ALLEGHENY—Continued			
ROUTE NUMBER AND NAME	FARE		FARE GOOD BETWEEN
	Day	Night	
110 Chagrin St Transfer	7 cents	10 cents	Perryville & Tappert and Tappert & Brown
111 Troy Hill	6 cents	10 cents	City Loop and Orchard St
	7 cents	10 cents	City Loop and City Line, Troy Hill
	7 cents	10 cents	Orchard St. and City Line, Troy Hill
111-A Lorrie & Orchard	8 cents	10 cents	City Loop and Lorrie & Orchard
112 Sandale St	8 cents	10 cents	City Loop and Pennsylvania & Beaver
	7 cents	10 cents	City Loop and Manchester Road
	7 cents	10 cents	Pennsylvania & Beaver and Manchester Road
114 Eastern Ave	8 cents	10 cents	City Loop and Pennsylvania & Beaver
	7 cents	10 cents	City Loop and Manchester Road
	7 cents	10 cents	Pennsylvania & Beaver and Manchester Road
118 Woods Run (Via Union Line)	8 cents	10 cents	City Loop and Columbus & Fulton
	7 cents	10 cents	City Loop and Brighton Road & Woods Run Ave
	7 cents	10 cents	Columbus & Fulton and Brighton Road & Woods Run Ave
119 South Loop	8 cents	10 cents	City Loop and Exposition Hill Park
1110 Exposition Transfer	8 cents	10 cents	City Loop and Exposition Buildings
120 Shadyside & Superior Transfer	7 cents	10 cents	Shadyside & Brighton Road and Superior & California
121 Spring Hill	8 cents	10 cents	Ohio & Chouteau and Route 66, Spring Hill
126 Fairview	7 cents	10 cents	Lancaster Loop and Lancaster & Pleasant
	7 cents	10 cents	Lancaster Loop and Perryville & Tappert
	7 cents	10 cents	Lancaster & Pleasant and Lancaster St. Loop
	8 cents	10 cents	Lafayette St. and Lancaster St. Loop
126 Harmony Route (P. B. Co. bus only)	8 cents	10 cents	City Loop and Ridge near Buffalo St
	7 cents	10 cents	City Loop and Exposition Road
	7 cents	10 cents	Ridge near Buffalo St. and Exposition Road
127 Chestnut	8 cents	10 cents	8th & 9th Aves. and North Ave

Operated only on special occasions

DIVISION No. 2—WEST END			
ROUTE NUMBER AND NAME	FARE		FARE GOOD BETWEEN
	Day	Night	
201 West Park	8 cents	10 cents	City Loop and Railway Shop between Curtiss and Shadyside St.
	7 cents	10 cents	City Loop and West Park Loop
	7 cents	10 cents	Railway Shop between Curtiss & Shadyside Sts. and West Park Loop
202 Carnegie	8 cents	10 cents	City Loop and Main & Walnut
	7 cents	10 cents	City Loop and Bell Island
	7 cents	10 cents	Main & Walnut and Bell Island
	7 cents	10 cents	Main & Carnegie and 4th Ave. Loop, Carnegie
206 Sandale St	7 cents	10 cents	Carnegie Road and End of Line, Sandale St
207-4 Shadyside-Exposition-Curtiss (Via Sandale St)	8 cents	10 cents	City Loop and Railway Shop between Curtiss and Shadyside Sts.
	7 cents	10 cents	Railway Shop between Curtiss & Shadyside Sts. and West Park Loop
208 Curtiss & Thornburg	8 cents	10 cents	City Loop and Main & Walnut
	7 cents	10 cents	City Loop and End of Line, Thornburg
	7 cents	10 cents	Main & Walnut and End of Line, Thornburg
208-A Thornburg Shuttle	7 cents	10 cents	Thornburg Jet and End of Line, Thornburg
208-Mt. Washington (Via West End)	8 cents	10 cents	City Loop and Railway Ave & Charlie Sheppards Station
	7 cents	10 cents	Main & Walnut and Railway Ave & Charlie Sheppards Station

Indicates schedule to increase to rate
Indicates schedule to decrease to rate
This rate may be paid on ticket, which will be valid only to expiration of night for 10 cents. A return slip will be returned on each trip of eight tickets, which will permit the owner thereof to pay return when the Company or the Seasoners may be required to make an amount of the increased rate.
NOTE: Return to rate above in heavy fare type.
NOTE: Return to rate above in heavy fare type.
NOTE: Return to rate above in heavy fare type.
NOTE: Return to rate above in heavy fare type.

PAGE OF TARIFF SCHEDULE. (NOTE: NIGHT FARES HAVE NOT BEEN PLACED IN EFFECT)

To obtain a more equitable assessment upon the car rider than the flat-rate system provides, and at the same time to eliminate the inconsistencies of a true zone system of collection, Pittsburgh has been divided as shown on the map on page 15. All persons who ride within the limits of this central 5-cent area pay a 5-cent fare—a reduction of ½ cent over that paid since last January. All persons who pass from the 5-cent to the 7-cent area, or vice versa, pay a fare of 7 cents. Also, all persons who ride entirely within the 7-cent area pay a 7-cent fare. The 5-cent area varies in radius from 2.2 miles to 3 miles and depends upon natural boundaries and local conditions for the dividing line.

The 5 cent-7 cent system of collection is very simple. All passengers boarding the cars in the downtown district pay as they leave the cars. This permits loading through all doors and greatly facilitates the maintaining of faster schedules during the rush hours. If a passenger leaves the car within the 5-cent area, he pays a nickel; if he leaves after passing the boundary of this area, he pays 7 cents. If a passenger transfers inside the 5-cent area to a car which will carry him into the 7-cent area his transfer bears such a mark of identification that the second conductor collects 2 cents upon presentation of the transfer. All passengers boarding inbound cars pay as they enter—if in the 7-cent area 7 cents, regardless of how far they ride; if in the 5-cent area, 5 cents.

Two registers are used on the cars for recording the two rates of fare. Only one of these can

be operated at a time, and when the car is passing from one fare area to the other the conductor has to go forward in the car and change certain mechanisms, an operation which would be noticeable to the passengers if performed other than at the proper time. Thus both error and dishonesty are eliminated.

On May 18 the company issued a schedule of rates and fares for Pittsburgh and surrounding territory in the form of a twelve-page pamphlet giving detailed information concerning fares, tickets, rates for special cars, etc. A page from this tariff is reproduced herewith, but it should be noted that the night rate of 10 cents has not been put into effect.

The new system of fares upon inauguration worked without friction. Passengers understood and paid the correct fare without question. Tickets are being sold eight for 55 cents, and it is expected that the majority of patrons living within the 7-cent area will avail themselves of these, both for convenience and economy. The only complaint which has been received concerns the passenger who rides a short distance entirely within the 7-cent area. It is understood by all railway men that it is the outlying end of a line that produces a deficit in receipts, and it is only fair that a passenger should pay for the service he receives. As both the value and the cost of the service in this section are greater than in the business district, the price should be correspondingly greater. Aside from this, the answer to this criticism is that it was a choice between a 5 cent-7 cent fare or a universal 7-cent fare, so the suburban patron would pay 7 cents in either case.

It is estimated by the Pittsburgh Railways that the 5 cent-7 cent fare will increase the revenue of the company to \$16,300,000. Figures substantiating or refuting this estimate will be available at a later date.

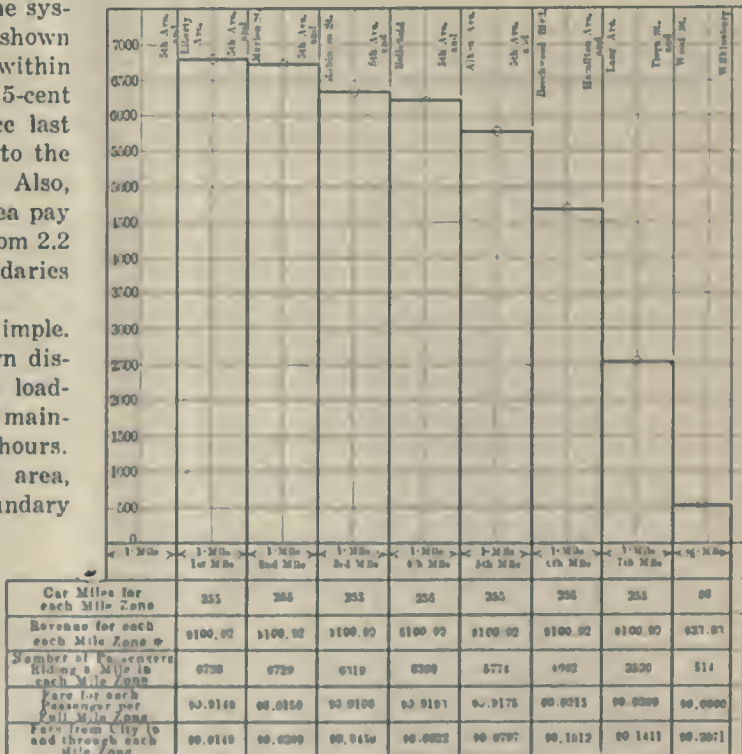


CHART SHOWING NUMBER OF PASSENGERS AND FARES PER FULL MILE ON EXACT ZONE SYSTEM FOR TYPICAL LINE

Skip Stop Will Save One Million Tons of Coal

Wastefulness of Every-Corner Stops Shown by Simple Comparisons—Fuel Administration Greatly Interested in Reform

BY CLARENCE RENSHAW

Conservation Division, United States Fuel Administration

IN THE TRAIN of troubles which the scarcity of fuel and other war conditions have brought to the electric railways, there is one bright spot. This is the growing recognition of the inconsistency of requiring the cars to stop at every street corner, regardless of whether these corners are located 100 or 1000 ft. apart.

On the electric railways of most cities there have heretofore been from twelve to fifteen stopping places per mile, averaging, in general, probably 400 ft. or less apart. The cars used on these lines are, in most cases, at least 40 ft. long, so that there is usually a stopping place about every ten car lengths. Where trailers or multiple-unit cars are used so as to give two-car trains, there is then a stopping place about every five lengths.

WHAT THE SKIP STOP MEANS

This is startling in a way, but the real situation can be better understood by a simple comparison. The average person has a length on the ground of about 12 in.

or 1 ft. In walking he ordinarily covers about 2½ ft. at each step. If in walking to reach a certain destination he were obliged to come to a standstill every four steps and then start again, he would be operating on a basis comparable with the usual city street car. If he were obliged to stop every two steps, the conditions would then compare with those for a two-car train.

If a railway manager will try stopping in this manner every four steps on his way to catch a train some morning, he will then have an interesting experience to discuss with the next electric railway official that he meets.

There is another simple experiment he should try before he undertakes to discuss this question, however, or he will not have the full story. He should go at a quiet hour when no one is looking, to the nearest building that is equipped with a revolving door and he should step in and out of this door, say, ten times. In doing this, he should not follow his ordinary habit of leaving the door

UNITED STATES FUEL ADMINISTRATION
WASHINGTON, D. C.

Bulletin No. 1985

SUGGESTIONS TO BE CONSIDERED IN ADOPTING THE
"SKIP-STOP" SYSTEM IN ORDER THAT MAXIMUM
FUEL SAVING AND REASONABLE IMPROVE-
MENT IN SERVICE MAY BE OBTAINED

In adopting the skip-stop system as a fuel-saving measure during the war, there are three fundamental principles which must be observed in order that the proper results may be assured. These are as follows:

- A. The system must be applied to the entire city, including the business district as well as the residence district, and not merely to the latter.
- B. The stopping points must be located so as to serve the people to the best advantage rather than to secure uniform spacing or to follow any arbitrary rule. This may bring some of the stopping points on the near side of the street, some on the far side, and some in the middle of a block. It is better, however, to have such a diversity, with the points properly located, than to have uniformity if convenience of location is sacrificed to secure this result.
- C. The number of stopping points must not be too great. There should be not more than eight per mile (averaging 660 ft. apart) in business districts, six per mile (averaging 880 ft. apart) in residence districts and four per mile (averaging 1320 ft. apart) in the open country.

The remarkable improvement in the service which has been effected in Washington by the skip-stop system has been largely due to the proper observance of these principles.

In addition to the above, which may be regarded as fundamental, there are a number of other items which should be carefully considered in each case, but which, on account of local conditions, may or may not apply. These are:

1. If the system is inaugurated gradually instead of all at once, it is preferable to put it into effect first in the congested downtown districts where a number of lines converge and to make it apply to all of the lines in that district. This will effect an immediate improvement in service on all of the lines and will prepare the way for a greater improvement when the system is extended.

2. The stopping points should be plainly marked, preferably by signs bearing the words "Car Stop" or some similar designation which will be clear to anyone, rather than mere-

ly by a colored stripe on the pole or other designation which is not self-explanatory.

3. There should be a sign in each car giving a list of the points at which stops are made, where this is practicable, or where this is not practicable, calling attention to the fact that the car stops only at certain streets and suggesting that passengers find from the conductor the nearest stop to their destination.

4. Where lines diverge, the stopping points should be located so that the stopping of cars of one line will not hold back cars of the other line. A typical instance is where one line continues on a given street while a second line follows the same route for a portion of the distance and then turns into a side street. In such a case if the cars of the first line stop in both directions beyond the point where the second line turns off and if the cars of the second line stop in both directions on the street which they alone use, the above object will be attained.

5. In many cases a staggered arrangement of stopping points, so that if the cars bound in one direction stop at First Street, Third Street, etc., those bound in the other direction will stop at Second Street, Fourth Street, etc., will distribute the advantages of the system in a more equitable manner among all of the patrons than an arrangement by which the cars stop at a given point in both directions and skip the next former stopping point entirely. There are other cases, however, where this arrangement is not practicable.

6. In connection with the introduction of the skip-stop system the matter of safety stops should be carefully reviewed. There are many points at which cars are now required to come to a standstill where equally safe operation can be obtained merely by having them slow down to a speed of 5 or 6 m. p. h.

7. Where interurban cars enter cities, it is desirable that they should not be required to stop at every city car-stopping point (since such cars require much more power for starting than the city cars) but they should stop not oftener than every quarter mile. This can readily be arranged for by the use of special signs at the interurban car-stopping points.

8. By observing the above policies it is ordinarily possible, when introducing the skip-stop system, to reduce the number of stopping points on city lines by from 30 to 40 per cent. This usually reduces the number of stops actually made by about 25 per cent. Under these circumstances the schedule speed of the cars can, as a rule, be increased by from 10 to 12 per cent. (without any increase in the maximum speed) while at the same time the power required (and hence the fuel) is reduced by a corresponding amount.

9. It has been more or less common, in introducing the skip-stop system, to begin with one or two lines and to reduce the stopping points only in the outlying sections, making all stops as usual in the business district. Such an arrangement does not give satisfactory results from the standpoint of either fuel economy or improvement in service. It is in the effort to avoid the introduction of the system on such a basis in any future cases that we are calling especial attention to the above principles which it is necessary to follow in order to secure the desired results.

spinning carelessly behind him as he goes in or out, but he should carefully stop it each time he passes and should start it again on his return trip. He should then go in and out another ten times, but during this period he should start the door once for all. He will find that a very light touch each time he passes will keep the door turning rapidly and he will be surprised at the difference in effort necessary to complete the series of enterings and leavings.

He is now ready to be of service to his railway friends if the local fuel administrator has not reached them first. In discussing the matter, he will not need to talk "speed-time curves, "acceleration," "kilowatt-hours," or any similar technical terms to prove his point. If one of his friends should happen to be of the "old school," now rapidly disappearing, (*i.e.*, all right from the shoulders down, but dead above them) and if the friend should pooh-pooh at his enthusiasm, he should not lose his temper but should remember how *he* felt last week. He should then, without unnecessary words, make his friend perform the above experiments for himself.

WHAT THE FUEL ADMINISTRATION IS TRYING TO DO

The United States Fuel Administration is confronted with the staggering task of reducing the coal consumption of the country by 60,000,000 tons per year. It must do this in ways which will not impose undue hardship on domestic consumers nor interfere with the production and transportation of material necessary for the war. It is the aim of the administration to save one of these sixty million tons by getting the electric railways throughout the country to introduce the skip-stop system on their lines. This idea was suggested to the Fuel Administration last winter by the American Electric Railway Association War Board which, as a means of illustrating the possibilities, had a study made in Washington which showed that the skip-stop system there should save approximately 10,000 tons of coal per year.

The results which may be looked for in general from this system are that, if properly applied, it should make it possible to increase the schedule speed of the cars by approximately one-eighth without any increase in the maximum speed, while at the same time reducing the power and hence the fuel consumption by a similar proportion. As an example of what has actually been accomplished the railway companies in Columbus, Toledo, Cincinnati and Detroit have reported savings in coal by the skip-stop system at the rate of 3600, 7300, 10,000 and 21,000 tons per year respectively.

HOW THE SKIP STOP SHOULD BE INTRODUCED

To obtain these results as to saving in fuel and at the same time to improve the service, it is essential that in adopting the skip-stop system it should be put into effect in the business district of a city, as well as in the residential districts. It is also important that the stops which are retained should be located sufficiently far apart to make the change worth while. The Fuel Administration has asked that the stops be located so that the distances between them will average not less than $\frac{1}{4}$ mile in business districts, $\frac{1}{4}$ mile in residential districts and $\frac{1}{2}$ mile in the open country.

Finally, the administration has suggested that the stopping places retained should be located according to the needs of the traffic, rather than by any arbitrary

rule, even though this should bring some of them on the near side of the street, some on the far side and some in the middle of short blocks. The administration has embodied these and other detailed suggestions in its Publication No. 1985, reproduced with this article.

In many cities, the stopping places of electric cars are regulated by municipal authorities or state public utility commissions. In such cases, the necessary authority must first be obtained from these bodies before the system can be put into effect. The United States Fuel Administration has been taking up the matter with these bodies where necessary through the various state and county administrators, and when the matter has been properly explained these bodies have all been glad to co-operate. The general public also has cheerfully accepted the skip-stop system, at first as a war measure necessary to save fuel, but afterwards on account of the improvement in service.

My own experience in Washington illustrates the improvement effected. Before the adoption of the system I could take a car at the corner of the cross street on which I lived and I then had a ride of about twenty minutes. After the skip-stop system was put into effect, I had to walk one and a quarter minutes away from the city to the nearest stopping point, but after boarding the car here I had a ride of only twelve or fourteen minutes. The conditions in Washington are peculiar, however, and there are few other places where so great a percentage increase in speed can be expected. In every instance, however, there should be a material improvement from the adoption of the skip stop.

ONE MILLION TONS SAVING POSSIBLE

In endeavoring to secure the adoption of the skip-stop system throughout the country as a conservation measure the Fuel Administration assumed from the start that it would have the hearty co-operation of all of the railway companies so that it need devote its efforts only to the public bodies. This, in general, has been the case. There are a number of companies in various parts of the country, however, whom the news of the movement has not yet reached, as well as a few which have not appreciated the importance of carrying out the details of the measure to the full extent asked by the administration.

Inasmuch as the skip-stop system will effect the desired saving in coal, not only without handicapping the service but with the actual improvement, and thus with benefit both to the public and the railway companies, it is an extremely unusual and desirable type of conservation measure. While the administration is endeavoring to secure the adoption of the system on a national basis as quickly as possible, it will appreciate anything which railway men themselves can do to assist it in spreading the news of the movement or in securing the prompt adoption of the system.

The measure is in effect or is about to be put into effect on a state-wide basis (that is, in all cities of the state of sufficient size to warrant it) in Massachusetts, Rhode Island, Connecticut, New Jersey, Delaware, Pennsylvania, Maryland, Indiana and the District of Columbia. In addition to this, it has been adopted in twenty-two large cities in other states. It is estimated that the above cities cover about one-third of those necessary to secure the desired saving of 1,000,000 tons per year and that the remainder will fall into line in the near future.

Power Limiting Circuit Reduces Load a Maximum of 30 per Cent

THE contract under which power is supplied for the operation of the electrified divisions of the Chicago, Milwaukee & St. Paul Railway involves a minimum payment per month of 60 per cent of the kilowatts for which the railway company has exercised an option, the power company standing ready to serve at any instant the number of kilowatts so optioned for. It thus becomes highly desirable for the railway to be in a position to hold its maximum demand down to a minimum—in other words, to run at as high a load factor as possible. The power indicating and limiting system for securing this result consists of a 1200-volt circuit running from the first to the last substation, and fed from a very small motor-generator in the load dispatcher's office. In each substation where there is a power company feed tap, there is installed a contact-making wattmeter, which introduces into the power indicating and limiting circuit an additional ohmic resistance whose amount varies with the load supplied at such feed tap.

There is also in each substation automatic apparatus which, when the total kilowatts used in the system reaches the amount optioned for and consequently when the current in the power indicating and limiting circuit has a certain value, causes resistance to be inserted in the fields of the substation generators of the motor-generator sets. This reduces the voltage on the trolley system, causing the speed of all trains to be decreased.

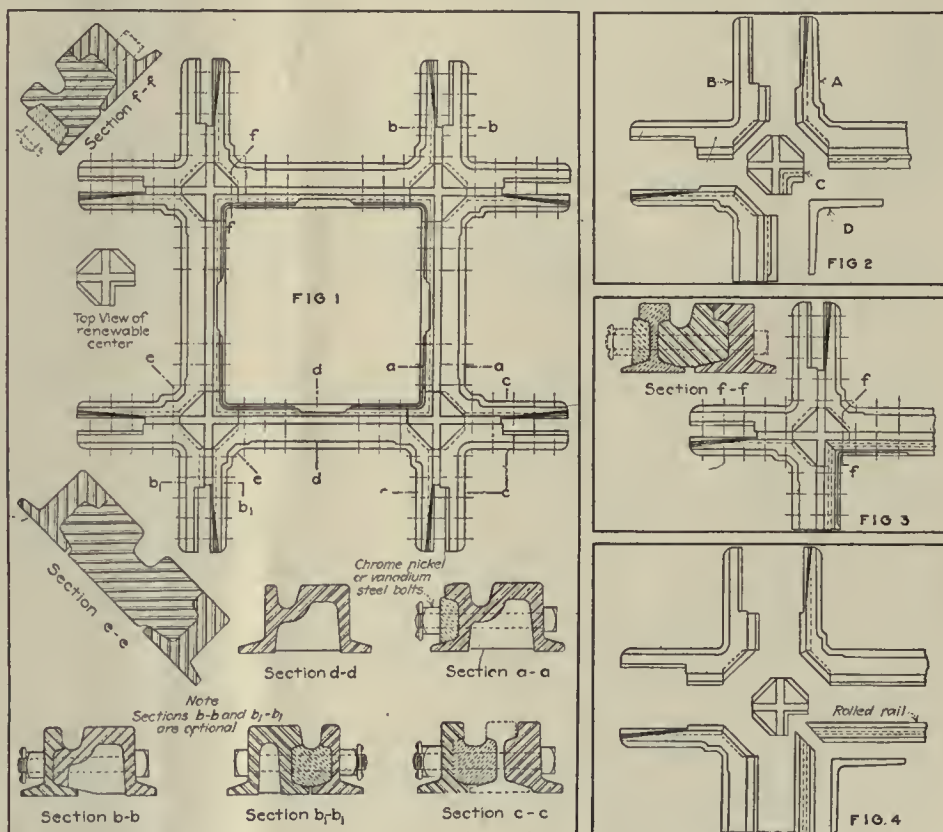
The maximum reduction in load thus obtainable is about 30 per cent of that which would be used in case the power indicating and limiting system were not provided. The apparatus is so arranged as to reduce the voltage of the most heavily loaded substations first, and also to reduce the voltage of any individual substation so as to throw this load on the other substations when the load on such substation reaches the certain amount for which the apparatus may have been adjusted. In the dispatcher's office there is a switchboard on which is mounted apparatus for controlling the small motor-generator set supplying the system, and also indicating and curve drawing wattmeters which show for any instant the total kilowatts supplied by the power company.

This work, like other electrical features of the St. Paul electrification, is in immediate charge of R. Beeuwkes, electrical engineer.

Articulated Cast Manganese Crossing with Renewable Centers

SINCE the description of the plain articulated cast manganese crossing, in the issue of the ELECTRIC RAILWAY JOURNAL for Jan. 26 was published, the inventor, Stephen Balkwill, president The Balkwill Manganese Crossing Company, Cleveland, Ohio, has secured patents on a renewable center crossing. The general principle used in this crossing is the same as that underlying the earlier one, but the new crossing has renewable centers, flexibly supported, around which the other parts of the articulated crossing are assembled. The details of construction are shown herewith by a number of line drawings.

Fig. 1 is a general assembly plan of a right-angle crossing of the new type, while Fig. 2 shows the separate pieces ready to put together. A complete crossing consists of four U-shaped pieces, like A, four corner pieces like B, four centers like C and four angle bars on knee-braces like D, together with chrome nickel or vanadium heat-treated steel bolts for fastening all together.



AN ARTICULATED TRACK CROSSING WITH RENEWABLE CENTERS

Fig. 1—Plan of right-angle cast manganese crossing
Fig. 2—Separate parts of crossing represented in Fig. 1
Fig. 3—Plan of right-angle crossing with rolled rail guards
Fig. 4—Parts of crossing represented in Fig. 3

In the drawings a number of cross-sections have been reproduced in order more clearly to show the construction. It will be noted that cross-sections *b* and *b1* are stated to be optional. The only difference between the construction as indicated in the two sections is that in *b* the two pieces forming the section at this point are directly connected together. In the alternative construction shown in section *b1* a filler block or separator is used between the two main pieces, which are recessed

to receive it. The former construction is slightly more substantial but the latter construction can be used, if desired, in order to simplify the grinding operation in fitting the parts together.

The feature of particular interest in this crossing, aside from the renewable character of the centers, is the arrangement of projections and recesses by means of which the several parts of the crossing are keyed or interlocked intimately and yet a certain amount of flexibility is provided. Projections, or tongues, are provided on the corner pieces which fit into recesses or grooves in the limbs or guard arms of the U-members. Both U-members and angle members are recessed to receive projections or tongues on the sides of the centers. All joints are a ground fit, manganese to manganese, no spelter being used. This plan is particularly applicable for combination steam and electric railway crossings, when one flangeway is deeper than the other. The same crossing body is used for all depths of flangeway and the renewable insert is made with any combinations or depths of flangeways as desired. All of this is clearly brought out in the cross-sections.

In some cases it is found desirable to use rolled rail guards, which can be done as shown in Figs. 3 and 4. This makes one extra set of four pieces, but somewhat simplifies the U-shaped castings. Exactly the same principle applies here as in the construction already described.

More than twenty railroads are using the plain articulated crossings of which many score have been installed during the past year. It is the expectation of the company that the new type will prove popular with electric railways in replacing the older types of crossings having renewable centers held in place with spelter.

Factors Affecting Arc Welding

THE arc welding process of repairing broken parts and fabricating new construction has been well known to railway repair shop men for a number of years. All the problems incident to the process, however, have not been solved. They still offer fruitful fields of endeavor for both the chemist and metallurgist. A recent investigation of the welding of mild steel by O. H. Eschholz, of the research engineering department, Westinghouse Electric & Manufacturing Company, has thrown some new light on these problems.

Of the various arc welding processes the one in which a metal rod acts both as electrode and weld filler has the widest use. With this process the filler rod automatically attains the melting temperature and is deposited in a molten state on the hottest section of the weld.

When, in the course of making a weld the metal electrodes are separated, an arc is formed having a highly luminous central core of iron vapor surrounded by a flame of oxides. In order to prevent excessive burning of the iron, the arc must be screened from local air currents as much as possible. This makes it necessary that the welder manipulate the electrode in such a manner that maximum protection by envelopment of the arc is secured. The best way of doing this is by the use of a short arc and the proper inclination of electrodes to compensate for air currents. The use of a short arc also promotes the fusion, concentration and economy of electrode deposit as well as gives it freedom from poros-

ity and reduction in the area affected by heat treatment due to the arc. With long arcs the arc flame cannot be controlled so that it becomes impossible adequately to protect the deposited metal from oxidation. The excessive porosity often found in welds, in the process of making which the arc was broken, is largely due to this cause. In general the action of the atmospheric gases is to refine the vaporized metal. As the field of application of the welding process widens, a method of securing better control of the weld ingredients appears more and more desirable. The use of a refractory tube or asbestos coating has been suggested. However, the difficulty of electrode manipulation is increased thereby to a prohibitive degree and excessive quantities of slag are formed and unavoidably imbedded in the weld. Better possibilities appear to lie in the development of an electrode which generates during operation an atmosphere of permanent gases enveloping the arc.

The fusion obtained at the weld surface and in the body of the filler is determined by the scarf angle, arc current and electrode diameter as well as by arc length. When the abutting sections of the material to be welded are inclined at too sharp an angle, the bottom of the weld is inaccessible and good arc contact is prevented.

The best results are secured when arc currents ranging from 20 amperes for a $\frac{3}{32}$ -in. electrode to 200 amperes for a $\frac{1}{16}$ -in. electrode are used. Porosity and incomplete fusion often result from welding with too low an arc current. The amount of slag formed and retained by the weld is dependent upon the cleanliness of the electrode and the manipulation of the arc flames to minimize oxidation.

Surface inspection of completed welds is an unsatisfactory check on the weld's characteristics. Observations, or preferably an automatic record of the arc voltage and current and electrode manipulation during welding, permit the formation of a better estimate of the finished product.

Pitting Overcome by Insulating Bearings from Their Shells

CAUSE of bearings becoming pitted by T. A. Borden of the engineering department of the Hydro-Electric Power Commission of Ontario, and another engineer claims that eddy currents are set up in the iron of the armature structure by short-circuited laminations. Both of these engineers agree that the best way to remove the trouble is to insert thin sheets of insulating material between the bearing shells and their housing in order that the stray current-circuit may be broken.

Referring to a previous experience, Mr. Borden states that in one case a brush was placed at one end of the shaft of a motor-generator set to reduce the sparking, on the journals and oil rings. This did away with the sparking at that end, but greatly increased the sparking on the other journal. With a brush placed at each end, the current was so great that the brushes were heated to an excessive temperature. Further experiments showed that this current had a value of several hundred amperes when measured either with a shunted d'Arsonval type meter or with an induction-type instrument through a series transformer.

LETTER TO THE EDITORS

Proper Designation for Pipe

NATIONAL TUBE COMPANY

PITTSBURGH, PA., July 1, 1918.

To the Editors:

We have noticed of late a number of references to pipe in editorial columns of the business papers, somewhat as follows: "Wrought-iron pipe was used in the steam lines." "This device was made from ordinary wrought-iron pipe, etc."

We should like to point out that there are three proper designations for pipe, as below:

Wrought Pipe. This is the generic term for steel or iron pipe. The average dealer in pipe refers to himself as a "dealer in wrought pipe." This means that he sells both steel and iron pipe

Wrought-Iron Pipe. This means just what it says, namely wrought-iron pipe, the product of a puddling furnace. This product comprises about 10 per cent of the wrought pipe made in this country.

Steel Pipe. This also means exactly what it says. Steel pipe comprises about 90 per cent of the present output of wrought pipe in this country.

Because wrought-iron pipe was the original pipe many people still refer to ordinary pipe as "wrought iron," whereas "wrought pipe" is the proper term. In the ordinary article referring to this product the chances are ten to one that the product is steel pipe, but in the absence of definite information the proper term is "wrought pipe." The term "wrought-iron" pipe is distinctly erroneous.

W. L. SCHAEFFER, Advertising Department.

Individual Contracts Forbidden

THE National War Labor Board has just handed down a decision which should be of interest to many electric railways. It is to the effect that the General Electric Company shall eliminate individual employment contracts at its plant at Pittsfield, Mass. At the same time the board turned the entire controversy at Pittsfield over to William H. Taft and Frank P. Walsh, the joint chairmen, as a section of the board with instructions to establish a just system of collective bargaining between the company and the men.

The decision is the first of its kind made by the War Labor Board. Individual contracts, submitted to men upon taking up employment at the plant, are characterized by the board as a source of irritation. One of the principal demands of the men was that the contracts be abolished and that a system be established by which the workers could deal collectively with the company. The order of the board is that such of the contracts as are now in existence be eliminated and that the company be directed to make none in the future.

The staff of the War Labor Board will devise a system of elections by which workers may choose committees to represent them in dealing with the employing firm. Up to this time the company has not recognized

either committees or individuals representing groups of the workers. At Schenectady, however, where there is a high percentage of organization, committee representation has for some time been recognized and accepted.

AMERICAN ASSOCIATION NEWS

Bulletin No. 23 Sent Out

THE American Electric Railway War Board has just issued bulletin No. 23 accompanying a copy of the brief submitted by the board to the National War Labor Board in the matter of the power of the President to fix rates of fare on electric railways. The War Board explains that it expects also to mail to member companies copies of the statements by Mr. McCarter and Mr. Gadsden to the War Labor Board, as soon as they can be printed.

May Outing for Rhode Island Company Section

THE May meeting of the Rhode Island company section was held at Peace Dale, near Narragansett Pier. The members went from Providence in special cars. The festivities included a trip to the pier, a sumptuous dinner and a varied program of short talks.

Program Largely Musical at Section No. 6 June Meeting

THE Chicago Elevated Railroads Company Section met on June 18 and was entertained with music, and amusing stories and reminiscences. Henry Cordell read a paper relating to his work on the Chicago, North Shore & Milwaukee Railroad. About 75 members and guests were in attendance.

Tribute to the Memory of Capt. H. A. Bullock

BY LETTER BALLOT the executive committee of the American Association has passed resolutions of appreciation of the work of Capt. H. A. Bullock, who was killed in action in France on May 31. Captain Bullock has been an active association worker and, so far as known, was the first member of the association to give his life for the cause.

Experimental Lecture at Toledo

DR. E. E. F. CREIGHTON, of the research department of the General Electric Company, gave an experimental lecture on lightning protection before an audience of nearly 500 at a recent meeting of the Toledo section. He traced some of the early history of the lightning arrester, paying especial tribute to the aluminum cell. He showed by means of experiments the effect of surges on transmission lines and illustrated the manner in which a good lightning arrester relieves the line from these surges.

Recent Happenings in Great Britain

Power Supply a Difficult Problem—District Board Proposed—The Shrinking Penny Fare—Economy Essential Everywhere

(From Our Regular Correspondent)

The committee appointed by the Board of Trade to consider the question of electric power supply has issued its report in a white paper. The chief recommendations include one that a new body called the Electricity Commissioners should be appointed and that it should assume the powers of the Board of Trade, the local government board for Ireland, and the Scottish office, relating to the supply of electricity. It is suggested that it receive large additional powers for regulating and encouraging the generation and distribution of electricity. The other recommendations are that subject to an appeal to Parliament in certain cases these commissioners should have general control over the generation and distribution of electricity in the United Kingdom; that the existing system under which electricity is separately generated for small areas should be abolished; that the commissioners should, after local inquiries, divide the United Kingdom into districts where a district electricity board should be set up to purchase all generating stations of authorized distributors, and be responsible for the future generation of electricity in their district; that existing electrical undertakers should, if they so desire, retain their power to distribute electricity within their local areas, but should purchase electricity in bulk from the boards or their lessees, due provisions being made for controlling the profits of distributors so as to insure a cheap supply; that district electricity boards should make no divisible profits, and should be financed by funds raised with government assistance, except where it is shown to be desirable and practicable to finance them locally.

PENNY NO LONGER POTENT COIN

The nimble penny as the tramway fare unit has done wonderful things. It has built up a great service of public utility which, after providing cheap transit on a commercial basis, has been able from time to time out of surplus funds to hand over large sums in relief of rates. But the penny is not the potent coin that it was. The leaps by which wages and prices of material have advanced during the war have radically altered its value. Stages could be shortened, but that would involve considerable disturbance of present organization. It is certain, however, that tramway undertakings will have to find some means of covering the greatly increased costs they now have to shoulder.

A proposal to reduce the number of "request stops" on the Manchester tramway routes will probably be put into force very soon. The saving of coal is not the only consideration, although a very important one. There is

the wear and tear of rails and rolling stock, which is considerably increased by the frequent stopping of the cars. J. M. McElroy, the general manager of the Manchester Tramways, has stated that the number of "request stops" has had a tendency to grow in every town, because pressure has been brought to bear by the public. The Board of Trade tramways committee, of which Mr. McElroy is a member, is giving special attention to this question. The number of passengers on the Manchester tramways has increased since the beginning of the war although the number of car-miles has been reduced. For the year ended March 31, 1914, 205,000,000 passengers were carried, and the car mileage was 19,463,000. For the year ended March 31, 1918, the number of passengers was 240,000,000, and the cars ran only 18,540,000 miles. In other words, the number of passengers increased by 35,000,000 and the car-miles decreased by 1,000,000. The City Council of Manchester has passed a resolution authorizing an arrangement with Mr. McElroy under which he will remain in the service of the corporation as general manager of the tramways department for five years, at a salary of £1,500 a year.

LONDON DIVIDED INTO FARE ZONES

Revised fares on the London County Council tramway routes south of the Thames have come into force. The new system of fares has been arranged on the plan of dividing the routes into stages, of which three can be covered for a 1d., six for 2d., nine for 3d. and anything above nine to the end of the route for 4d. Similarly, increased fares on the routes north of the Thames will come into operation as soon as the County Council has completed arrangements with other authorities in conjunction with whom it works some of these lines. The Council, in common with all other tramway authorities, has been notified that coal consumption in connection with the tramways must at once be reduced by at least 15 per cent. Suggestions made are the reduction of service not required in the national interest, the withdrawal of service for the whole or part of Sundays, the stopping of cars at an earlier hour in the evening, the partial substitution of coke locally produced for coal, and the grant of a bonus to motormen for economy in power consumption.

A new defence of the realm regulation provides that the Board of Trade may authorize the local authority to charge the local rates or funds with any deficiency that may result where a tramway undertaking is carried on efficiently under statutory powers by a local authority but cannot be run without charging fares in excess of those authorized or without applying local

rates in aid of a deficiency in the revenue. The Board of Trade is also authorized to modify any provision in any local act regulating the undertaking, or to relieve the local authority from the obligation of making allowances for the items of renewals or depreciation.

Christopher John Spencer, general manager of the Bradford Corporation Tramways, recently testified before the select committee of the House of Commons on municipal tramways (statutory requirements). He said that since the outbreak of war the cost of production had increased enormously. In consequence almost all tramway undertakings had to consider their financial position. The general manager of the Leeds Corporation Tramways estimated that unless the fares at Leeds were increased there would be a deficit of £45,000 for the current year. The main cause for the increased expenditure on tramways had been the increased cost of labor. The wage bill of tramway undertakings had increased approximately 70 per cent, and in some cases even 100 per cent. The application now under consideration for a 12½ per cent bonus on present rates would, if granted, mean another considerable increase in cost. In munition centers there had been a considerable increase in the number of passengers with a consequent increase of receipts, but expenditures were now increasing more rapidly than revenue.

There was also another disquieting feature in the situation. The Board of Trade had already intimated to tramway authorities that in consequence of war-time circumstances it would be necessary to curtail car mileage. While this would reduce certain expenditure it did not affect standing charges. The present scale of tolls and charges for the carriage of parcels and goods was so obviously out of date that it was impossible to extend the conveyance of parcels and goods without considerable loss to the undertakings. It was suggested by Mr. Spencer that the Board of Trade be authorized to set aside the statutory limitations of tolls and charges in respect to passengers' parcels and goods for the period of the war in cases where it was satisfied that sufficient reason existed.

WOMEN DRIVERS FOR LONDON

Women tramcar drivers will probably soon be seen in London for the first time. They have been driving in Glasgow and other cities for the past two years, but until recently the Commissioner of Police for London has refused to license them. The manager of the Walthamstow Tramways recently stated that five women had passed through the three weeks' course of training, and were ready to take out the cars as soon as their licenses were received. They had all been conductresses on the tramway for some time. They will take the place of Grade I and II men, and will be paid the same rate of wage as the men, 31s., rising to 37s. 6d., with a war bonus of £1 a week.

A. C. S.

News of the Electric Railways

TRAFFIC AND TRANSPORTATION

FINANCIAL AND CORPORATE • PERSONAL MENTION • CONSTRUCTION NEWS

Service-at-Cost Suggestion

Director of Street Railroads of Cincinnati Sees This as Best Way Out for City and Company

W. C. Culkins, Director of Street Railroads of Cincinnati, Ohio, has outlined a service-at-cost plan for the Cincinnati Traction Company in connection with the revision of the ordinance now under way. While the company has made no formal request for an increase in its rate of fare, this is in contemplation. Mr. Culkins has taken it into consideration.

SERVICE-AT-COST BEST

He says it would be unfair to fasten upon the people of Cincinnati until 1931 a franchise drawn to fit the war conditions of to-day. On the other hand, if the proposed franchise is based upon conditions existing before the war the company would refuse to accept it. He says the service-at-cost plan would give the city the kind of service the people were willing to pay for. After all, service was paramount. Should the rate of fare be established to meet present conditions, the new plan would make a reduction possible as soon as a drop in the cost of operation and the price of materials warranted it. In case the company asked for an increase in the rate, the burden of proof would be upon it.

Mr. Culkins also advised elasticity in the contract so far as it relates to the use of the company's tracks by interurban cars. Due consideration should also be given to the possible development of a freight service.

MR. DRAPER PRESENTS COMPANY'S SIDE

When he appeared before the street railway committee of the City Council on June 25 to discuss the proposed revision of the street railway ordinance, Walter A. Draper, vice-president of the Cincinnati Traction Company, presented an array of figures that are calculated to make the members consider well before they decide upon a rate of fare under present conditions.

The company's estimate for 1918, without providing for increase on account of improvements, taxes, higher wages and contingent expenditures will necessitate an income of \$5,906,897. Revenue from other sources and estimated savings will reduce this to \$5,536,897. On the other hand, additional amounts necessary to cover the items excepted would aggregate approximately \$500,000 annually, making a total of \$6,036,897 to be secured from fares.

Mr. Draper said that an increase in the rate of fare would result in a decrease in the number of fares collected.

In 1917 the number of riders was 110,000,000. It is estimated that this number would be reduced to 100,000,000 under an increased fare. These riders would have to yield the amount mentioned above, namely \$6,036,897. To do this the fare would have to be a little over 6 cents a ride. If the city would relieve the company of the tax of 6 per cent on its gross earnings, the amount to be raised from car patrons would be about \$5,700,000 or a little over 5.75 cents a ride.

The net income in 1917 showed an increase of \$200,000 over 1916, but Mr. Draper estimated that the net income for 1918 will show a decrease of \$585,000 from that of 1917, or an actual deficit of \$437,000, without providing for dividends on the preferred stock, funds for improvements or an increase in the wages of the men. He said that this was due to the absence of 18,000 men from the city in the service and the greatly increased cost of materials.

The largest item of expenditure in 1917 was for wages. The amount was \$1,924,000, of which \$1,500,000 went to the conductors and motormen. Despite the fact that the company has a contract with the men running to July 1, 1919, Mr. Draper declared that it would be necessary to increase wages just as soon as additional revenue could be secured. He enumerated other items and showed where increases would be necessary, if the road was to be kept in condition to give proper service.

Wheeling Arbitrators Report Findings

As a result of the agreement between the arbitrators comprising representatives of the West Virginia Traction & Electric Company and the Wheeling Traction Company, Pan Handle and the City Railway lines, Wheeling, W. Va., and the members of Local Union No. 103 of railway employees and a representative of the federal government, the trainmen and others will receive substantial increases for the ensuing year. It is reported that the men will receive from 38 cents to 45 cents an hour, on a sliding scale, this representing an increase of approximately 10 cents an hour. Following the war the men will work only eight hours a day and six days a week.

The arbitration board concluded its report with a recommendation to the Public Service Commission for relief for the various companies affected by the agreement entered into between the employees and the companies, stating that in its opinion there was a pressing need for an examination of the situation by the commission with a view to increasing rates.

New Transit Lines Opened

Several Important Additions Opened to New York's \$350,000,000 New Rapid Transit System

Operation of the new Seventh Avenue subway, which was placed in service in June, 1917, from Times Square to the Pennsylvania Railroad Station at Thirty-third Street, was extended South to the Battery on the main line and to the Wall Street station on the Park Place and William Street branch on July 2.

16.7 MILES OF NEW LINE ADDED

With the portion already in operation, the opening of the Seventh Avenue subway will add approximately 16.7 track-miles to the dual system lines now in use. The Seventh Avenue lines extend south from Times Square as a four-tracked structure to the vicinity of Chambers Street and West Broadway, whence two tracks continue to a loop at the Battery, while the two remaining tracks branch through Park Place, Beekman and William Streets to Wall Street, the terminus of temporary operation.

Eventually the so-called Wall Street branch line will be extended to Brooklyn by way of the Old Slip—Clark Street tunnel line, which will connect with the existing Interborough lines in Brooklyn near Borough Hall. Through service on the Seventh Avenue subway in connection with the old subway north of Forty-second Street will be begun a few weeks hence, when the Lexington Avenue line is completed and can be placed in operation in connection with the old subway in Fourth Avenue below Forty-second Street near the Grand Central Terminal.

Another dual system line placed in operation on July 2 was the portion of the 162nd Street connection, east of Sedgwick Avenue to Jerome Avenue. This connection unites the west side elevated lines in Manhattan with the Jerome Avenue branch of the Lexington Avenue subway in the Bronx. The connection was previously in operation as far as Sedgwick Avenue.

JAMAICA ELEVATED EXTENSION OPENED

On July 3 the New York Consolidated Railroad, a subsidiary of the Brooklyn Rapid Transit Company, placed in service by direction of the Public Service Commission for the First District the unopened portion of the Jamaica Avenue elevated line from Greenwood Avenue, Richmond Hill, to Cliffside Avenue at Jamaica, the terminus of the line. The road was placed in service as far as Greenwood Avenue last year. It will add materially to the transit facilities in Queens.

Government to Control Unskilled Labor

On Aug. 1 Federal Employment Service Will Supplant Private Agencies—Survey of Material Started

After Aug. 1 the United States Employment Service will undertake to be the medium through which employers in the whole country will secure unskilled labor. The country is divided into thirteen districts with four hundred branch offices.

The centralization of recruitment of unskilled labor will affect establishments employing a hundred or more workers. Establishments employing a smaller force will be free, if they choose, to proceed in their usual manner. The concerns which come within the plan, too, will be permitted to hire in the ordinary way such workers as present themselves without inducements from the employer. In other words, employers will be free to engage men who offer themselves without having been solicited, directly or indirectly.

The plan is a military necessity, intended to put an end to the waste and disorganization which arise from "stealing labor." As far as the plan operates to withdraw unskilled labor from industries not directly connected with the war, the withdrawals will be distributed as equitably as possible, under the control of the War Labor Policies Board. Priorities for labor will be established only where there is an actual shortage.

The coming monopoly of the government in distributing unskilled labor will not extend to skilled labor, and for the present such labor may be recruited by all employers as heretofore. At the same time, the offices of the United States Employment Service will in no way decrease their work of providing skilled workers.

LABOR SURVEY ALREADY BEGUN

The United States Employment Service has already begun an approximation of the common labor requirements of war industries for the next three months and of the common labor reserves in each state which may be utilized for war production. With these two national estimates as a basis, the employment service will allot the quotas of unskilled workers which each State will be called upon to furnish.

The war industries will report their needs by means of a special form issued to each industry through the particular government department or board with which its contract is placed. The form asks the immediate common labor requirements, an estimate of the weekly requirements from July 15 through August, and a lump estimate of its needs from Sept. 1 to Oct. 1. The questionnaire also asks, in substance, what percentage of the total of common laborers in each state in 1914 is now engaged in agriculture, transportation, mining or other war work. It then asks the estimated number of common laborers now in each state who are not engaged in war work.

Immediate and full return of the requirement blanks is urged upon every war industry receiving them. Any concern engaged in war work which does not receive its forms should apply at once to the state director of the employment service for the state in which it is operating.

Short Strike in Columbus

Officers of the Columbus Railway, Power & Light Company, Columbus, Ohio, and representatives of the Amalgamated Association reached an agreement on July 1 to submit their differences to the National War Labor Board for settlement. This action was taken in response to a telegram from the board urging that this be done at once in order to prevent loss and inconvenience. The questions to be submitted are hours of labor, working conditions, wages and the reinstatement of seven men who had been discharged. The company recognized the union only tentatively, in order to submit the matter to the board.

Operation was resumed late on the evening of July 1, after the road had been idle almost forty-eight hours.

Bellaire Tries to Shackle Railway

The twenty-five-year franchise under which the Wheeling Traction Company has been operating its lines within the town of Bellaire, Ohio, expired about two months ago. In an effort to secure renewal of its right to operate over these lines, the company presented to the Town Council for its consideration a proposed form of agreement which was practically identical with the old franchise.

The railway proposal was rejected by the city officials, who in turn presented a proposed franchise of their own. This contained many restrictions, as illustrative of which may be mentioned excessive requirements in the way of street paving, lighting of all street intersections along the car lines, and the maintenance of flagmen at all railroad crossings. Altogether the conditions were so burdensome that the traction company could not accept the franchise in its proposed form. It attempted to effect a compromise but was unable to do so.

In the meantime the Council, as a coercive measure, passed a resolution requiring the railway to pay the city \$25 a day rental for the time during which the lines were operated without a franchise. The company has refused to pay the rental, and as a retaliatory measure the Council has just passed another resolution instructing the town solicitor to sue for an injunction prohibiting the company from operating within the Bellaire corporation limits. As the railway is at present the only means of transportation available to a large number of mine and steel mill workers who are engaged either directly or indirectly on government work, complications will likely arise if the injunction is granted.

Operating Agreement on Pacific Coast

City of San Francisco Buys Operating Rights on Private System for Municipal Line

A plan to provide local car service for the residence district west of Twin Peaks Tunnel in San Francisco, Cal., has been presented to the Board of Supervisors by M. M. O'Shaughnessy, city engineer. Officials of both the Municipal Railway and the United Railroads systems have tentatively agreed that the city shall use the tracks of the United Railroads, the rental for which shall apply as part payment on the properties, in the event that the city purchases the private system before the franchise expires. Features of the arrangement are as follows:

The city is to pay to the United Railroads \$100,000 for the right of operation over the Ocean Avenue tracks from Sloat Boulevard to Harold Avenue, this sum to apply as part payment on the United Railroads' lines if purchased by the city before the expiration of the franchise. The United Railroads is to maintain the tracks and trolley and furnish the power for the city cars at the rate of 7½ cents per car-mile operated, which is said to be the average actual cost of the United Railroads. The city is to construct the necessary connection between its tunnel tracks and the United Railroads tracks. This can be done, it is believed, in about forty-five days.

In Parkside, the track farther to the north, the plan tentatively agreed to by both parties is that the city shall have unlimited use of the United Railroads tracks on Taraval Street, in consideration for which the city is to lower the tracks to grade and pave the street. After this the maintenance will be divided by the city and the private company in proportion to the car mileage operated. In this section power for the city cars will be furnished by the United Railroads at the rate of 1¼ cents per kilowatt-hour. The plan is approved by Mayor Rolph, provided no legal entanglements will result. The whole matter has been referred to the city attorney.

Power Plant Saving Campaign

The United States Fuel Administration has announced the appointment of administrative engineers as follows:

Thomas R. Brown, Pittsburgh; for the western half of the Pennsylvania. He was formerly special engineer with the Westinghouse Air Brake Company.

George R. Henderson, Philadelphia; for the eastern half of Pennsylvania. He was formerly consulting engineer with the Baldwin Locomotive Works.

Edward N. Trump, New York; for the State of New York. He has been the vice-president of the Solvay Process Company.

W. R. C. Corson, Hartford; for New England. He has formerly been a consulting engineer.

The administrative engineers will work under the general supervision of state fuel administrators. The campaign includes: (1) Personal inspection of every power plant in the country; (2) classification and rating of every power plant, based upon the thoroughness of which the owner of the plant conforms to recommendations; (3) responsibility of rating to be based upon reports of inspectors, who will not express opinions, but will collect all the definite information that is available.

State fuel administrations, in their judgment, may entirely or partially shut off the consumption of coal by any needlessly wasteful plant in their territories.

Chicago Ordinance Goes to Main Committee

The sub-committee of the Chicago City Council on June 28 having learned from the traction companies that the proposed ordinance was acceptable recommended it to the main committee. At this meeting a complete draft of the franchise was presented, and attention was called to several features which had not previously been determined.

One of these sections refers to labor. It provides that hours and working conditions shall conform to just and reasonable standards of safety, health, comfort and efficiency, and that all wage earners employed by the company shall receive "wages which shall be just and reasonable and not less than shall be customarily paid for services of like character under substantially similar conditions." The local commission is to have power to settle disputes under this section, if it is finally approved.

Another section paves the way for carrying express matter and package freight on the combined system of surface and elevated lines, at such times as will not interfere with passenger service, subject to regulation by the local commission.

One element of opposition has been overcome by changing the plans for one of the downtown elevated lines which was to have been a double-deck structure. It is expected that sufficient time still remains to discuss the ordinance and get action in the main committee and the City Council before adjournment.

At a recent meeting of the sub-committee Walter L. Fisher placed at the disposal of the members his resignation as special traction counsel. He referred to differences of opinion which had arisen on questions of policy and said he would like to be free to express his objections of the ordinance if it goes to a referendum vote. When this matter was taken up by the main committee it was decided to retain Mr. Fisher as advisor on legal questions.

The full committee began its sessions on July 1 and made several slight changes in the draft of the ordinance as submitted to it.

Dorchester Extension Opened

The Broadway-Andrew Square section of the Dorchester tunnel was opened for traffic by the Boston (Mass.) Elevated Railway on June 29. The new line is a double-track subway with 8845 ft. of single track installed, and is equipped for train operation along the same general lines as the previously operated route east of Harvard Square, Cambridge to Boston. Congestion at the recently opened Broadway station of this tunnel in South Boston, will be relieved by the new line as will also congestion at Dudley Street, Roxbury. There will be a saving of five minutes on each trip from the Dorchester district into and out of the business center of Boston. One of the most valuable features of the new service is the reduction in running time between residential areas in Boston and the Victory plant at Squantum, where destroyers for the United States Navy are being built on a large scale. At Andrew Square there is a transfer station with two surface car loops and two train platforms on a lower level.

News Notes

Fire in St. Louis Destroys Equipment.—A fire on June 14 destroyed a section 400 ft. long by 75 ft. wide of the De Baliviere car sheds of the United Railways, St. Louis, Mo., at Delmar Boulevard and De Baliviere Avenue. The flames consumed nine Olive line motor cars, four trains consisting of motor car and trailer, eight or nine roofless "moonlight" cars, and six storage cars and a snowsweeper.

Bus Men to Be Pensioned.—The Fifth Avenue Coach Company, New York, N. Y., has adopted a system for pensioning its employees who have reached the age of seventy years, or who have been in the company's employ twenty-five years. Any employee who has been in the service twenty-five years and has been disabled will be pensioned under the plan. The pension system will not debar any employee from engaging in any other business.

St. Louis Settlement Vote in November.—The United Railway settlement ordinance will not be voted on in St. Louis until the regular election in November. The final count of the valid signatures on the referendum petitions filed by the Citizen's Referendum League failed to total a sufficient number for a special election within ninety days, as expected. The provisions of the settlement ordinance were commented upon editorially in the *ELECTRIC RAILWAY JOURNAL* of May 4, page 840.

People's Champion After Profits.—At the recent hearing in Flushing, Long Island, on the appeal of the New York

& North Shore Traction Company for a 7-cent fare Mayor Hylan of New York is said to have stated the municipal ownership policy of his administration as follows: "I am in favor of municipal ownership, but I feel that if the city is going to take over a public utility, it ought to take over one that is paying so it will lessen the burden on the taxpayers. Our theory is to take over a public utility that is paying big profits at first and then the next best one and so on so as to help the taxpayers. We prefer that to taking over a losing proposition such as this one."

Wage and Fare Appeals Coupled.—The union of employees of the Memphis (Tenn.) Street Railway has appealed to the Mayor and the City Commissioners to proceed with the investigation requested by the company in connection with its request for 6-cent fares. The employees say they are interested in the 6-cent fare only in so far as it bears on their securing a decent living wage, and that they want the investigation only in order that they may be able to proceed intelligently with their negotiations for a new wage agreement. The men say that "as living costs have advanced 100 per cent in most instances, we feel justified in asking our company for an increase in wages of approximately 85 per cent."

More Buffalo Crooks Sentenced.—Three more conductors employed by the International Railway, Buffalo, N. Y., have been convicted of stealing fares. One was fined \$25; another was fined \$5 and one was sent to the penitentiary for nine months. These convictions bring the total during the last month up to eleven. The men were charged with larceny, and it is alleged they withheld fares from the fareboxes and also manipulated the fareboxes in such a manner that coins would not register on the dial of the machines. One of the men convicted is charged with making devices which he sold to conductors for \$10. These devices could be placed in a farebox in such a manner that the fares would not register on the dial.

How Yonkers Regards Mr. Sutherland.—The Yonkers *Daily News*, in commenting editorially on the career of Leslie Sutherland, recently elected second vice-president of the Third Avenue Railway, New York, N. Y., said in part: "Yonkers is proud of Leslie Sutherland—proud with the pride of a mother who has watched the growth of her child, has seen him reach maturity, has learned to lean not a little upon his strong right arm, and who, with mingled feelings of sorrow and joy, sees him answer the call of responsibilities that will take him away from the home circle. Yonkers had learned to respect his strength, to place faith in his judgment, to call upon him for advice. In a very true sense he became a favorite son. And now, as larger duties call him, she bids him good-by, with pride in her heart, but not without sorrow. Wherever the paths of success may lead him Yonkers cherishes the hope that he will not forget the old home and the mother who loves him well."

Financial and Corporate

I. R. T. Would Issue Notes

Wants to Put Out \$37,700,000 of Three-Year 7 per Cent Securities At About 96½

The Interborough Rapid Transit Company, New York, N. Y., on June 29, filed with the Public Service Commission for the First District, an application for approval of a proposed collateral trust agreement securing \$37,700,000 in three-year 7 per cent notes and for authority to issue and dispose immediately of \$33,000,000 thereunder. Several days ago the company filed an application for permission to issue about \$58,906,000 of bonds to be used as collateral for the contemplated note issue.

The commission set July 10 at 10.30 a. m. as the date for the hearing on the bond issues, and at the same time will consider the merits of the note issue proposal, as the two are linked.

W. F. C. WILL PROBABLY HELP

Eugene Meyer, Jr., a member of the War Finance Corporation, said on June 29, that he felt sure that corporation would take about 30 per cent of the proposed note issue. He said that he personally felt 87½ was a fair price for the bonds, and 7 per cent interest rate reasonable. It is asserted that the conditions will require the sale of the notes at not less than 96½ per cent of par.

Of the proceeds derived from the sale of the \$33,000,000 immediately put on the market, \$31,845,000 are to be devoted to the following purposes:

For equipment under subway contract No. 3.....	\$18,827,000
For Manhattan Railway third tracking	10,897,000
For Manhattan Railway power plant improvement.....	2,121,000
Total	\$31,845,000

Last year the commission authorized the Interborough Rapid Transit Company to issue about \$39,000,000 in bonds to meet obligations incurred in the work of constructing and equipping the new subway and elevated lines. These bonds were to be disposed of at 93½ or more. Owing to inability to dispose of the bonds at that price, the company has now requested the commission to permit a large issue of short-term notes to be secured by the bonds as collateral.

Pending the July 10 hearing, city officials will confer in reference to questions involved, particularly whether the city's interest in the dual subway lines will in any way be affected.

Northern Electric Railroad Successor

Articles of incorporation were filed on June 20 for the Sacramento Northern Railroad, which is to take over the Northern Electric Railroad and its subsidiary lines, the plans for the reorgan-

ization of which were reviewed in the ELECTRIC RAILWAY JOURNAL for June 15, page 1161. The articles state that, in addition to operating the road, the new company will build 5 miles of standard gage track from the M Street bridge over the Sacramento River to a point 5 miles distant in Yolo County.

The fifteen directors represent the reorganization committee and the various creditors of the Northern Electric Railway. They are: E. D. Sullivan, F. M. McAuliffe, Delger Trowbridge, William S. McKnight, William H. Gorrill, Walter Slack, Charles C. Sullivan, A. E. Roth, A. D. Plaw, F. M. Hultman, A. E. Wellington, E. K. Pedler, W. G. Gardiner, Jerome B. White and G. S. Sahlender.

The roads taken over by the new corporation are the Northern Electric, the Sacramento-Woodland Railroad, the Marysville-Colusa branch of the Northern Electric and the Vallejo & Northern.

The reorganization committee purchased the Northern Electric Company at the foreclosure sale on May 28.

Responsible for Underlying Bonds

Pittsburgh Subsidiary Wants Controlling Companies Held Liable—Court Refuses Interest Payment Now

George Wharton Pepper, Philadelphia, representing the bondholders of the United Traction Company, appeared before Judge Charles P. Orr in the United States District Court in Pittsburgh on July 1 and filed a petition asking that the Philadelphia Company and the Pittsburgh Railways be jointly held responsible for the indebtedness of several million dollars to the bondholders of the United Traction Company. It is asserted that the property of the underlying companies has not been conserved properly.

The Philadelphia Company, through stock ownership, controls the Pittsburgh Railways, and the latter company in turn owns a large majority of the stock of the United Traction Company. The pending suit in equity was brought by the bondholders of the United Traction Company and was filed several months before the receivers for the railway were appointed.

Almost coincident with the foregoing plea Judge Orr handed down a decision refusing the assent of the court to the payment, at this time, by the receivers of the Pittsburgh Railways, of nearly \$500,000 as interest to underlying companies. Judge Orr says that the prospect of the company performing its full duty to the public and of meeting the just demands of its creditors is at present so dim that

the court hesitates to make an order for the payment of fixed charges.

The Pittsburgh Railways was placed in the hands of James D. Callery, H. S. A. Stuart and Charles A. Fagan as receivers on April 23 by judges of the United States District Court.

T. H., I. & E. Returns for 1917

Gross Earnings Gain \$186,000 or 5.83 per Cent, but Operating Expenses Rise \$223,000 or 12 per Cent

The income statement of the Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., for the year ended Dec. 31, 1917, follows:

Gross earnings from operation.....	\$3,386,364
Operating expenses	2,087,472
Net earnings	\$1,298,891
Taxes	179,362
Operating income	\$1,119,528
Other income	200,343
Gross income	\$1,319,872
Deductions from income:	
Bond interest	\$760,410
Dividends	234,291
Interest on notes	36,776
Maintenance of organization leased lines	3,000
Surplus	\$285,393
Sinking fund	207,742
Balance	\$77,650

While the gross earnings for 1917, as compared with 1916, showed an increase of \$186,840 or 5.83 per cent, the operating expenses increased \$223,794 or 12 per cent, making a decrease in net earnings from operation of \$86,953. This falling off was principally due to advances in the cost of material and increased wages. Taxes were increased \$17,911 above 1916.

The total expenditure for 1917 for maintenance of ways and structures was \$288,054 and for maintenance of equipment \$192,600. Improvements on account of owned lines included the erection of a freight building 401 ft. x 30 ft. on the new freight terminal property on Kentucky Avenue, with the construction of seven tracks on this property.

The total amount expended for added property during the year was \$305,766. The total investment in addition to plant, property and equipment to Dec. 31, 1917, for which no bonds or securities have been issued, and including payments to sinking funds and investments in securities of affiliated companies amounted to \$2,285,467, an increase of \$316,923 over the year 1916.

Miscellaneous traffic and operating statistics for the year 1917 follow:

Passengers carried—interurban lines	9,257,115
Passengers carried—city lines	13,370,894
Total passengers carried	22,628,009
Freight handled (tons)	99,447
Express handled (exclusive of Wells-Fargo), tons	15,362
Car-miles operated—interurban lines	5,697,873
Car-miles operated—city lines	2,338,007
Coal consumed at power station (tons)	243,522
Power generated, main power station (kilowatt-hours)	97,181,993

The company refers to the purchase during the year of a coal mine in Sullivan County under an agreement made with three other electric railways in Indiana, one of them the local Indianapolis company. This agreement was previously reviewed in this paper.

Finance Corporation Grants \$1,000,000

New Orleans Company Is Promised Direct Loan If Holders of \$4,000,000 Debentures Accept One-Year Notes— Other Financing Happenings

In pursuance of its apparent policy of helping those utilities which can help themselves, the War Finance Corporation on July 2 announced that it had agreed to advance to the New Orleans Railway & Light Company \$1,000,000 to reimburse it for necessary expenditures, the corporation in return taking the company's note for the amount. The loan is based upon the condition that the holders of \$4,000,000 of two-year 6 per cent debentures, which matured on June 1, exchange them for new one-year 7 per cent notes.

The issue of debentures went unpaid at maturity because of the refusal of the War Finance Corporation to advance the money on the ground that it had no authority to make direct advances to corporations except in exceptional cases. At the time President Curran sent out a circular to the note-holders, explaining the circumstances and asking them not to press for payment until an opportunity had been afforded to work out an extension plan.

This plan, later submitted, called for the refunding of the matured notes, par for par, into the new notes, callable at 100 and interest on thirty days' notice. Mr. Curran now asks the holders to deposit their debentures in acceptance of the refunding plan, as not until its success is assured will the War Finance Corporation advance the \$1,000,000 it has promised. More than 50 per cent of the holders have already deposited their securities.

B.R.T. REFUNDING IS PROGRESSING

Holders of the \$57,735,000 of Brooklyn Rapid Transit Company 5 per cent notes will have until July 10 instead of July 1 to deposit their holdings, under the proposed refunding plan, with the Central Union Trust Company, in order to have them taken up, 30 per cent through cash furnished by the War Finance Corporation and 70 per cent through the new issue of 7 per cent three-year notes.

Up to the close of business on July 2, it was said, approximately \$25,000,000 of the old notes had already been deposited. They were coming in at a rate that indicated the acceptance of the refunding plan by virtually all the holders.

A committee of Philadelphia bankers has been appointed to consider the public utility problem. The members are: J. R. McAllister, John H. Mason, Effingham B. Morris, Arthur E. Newbold, Levi L. Rue, Joseph Wayne, Jr., and William P. Gest, chairman. It is probable that a sub-committee will be appointed to confer with bankers in other cities. Similar committees have been appointed for New York, Boston and Chicago.

The Capital Issues Committee on June 29 announced the appointment of

Dudley Cates, San Francisco, as secretary and chief examiner, and the creation under him of a new bureau of examiners to digest applications for approval of proposed securities issues. This bureau will assist in gathering information on these issues from local capital issues committees in each Federal Reserve District, and from the Fuel, Food, and Railroad Administrations, War Industries Board, and other government departments which can throw light on the war necessity of the project covered by proposed securities issues.

Frederic A. Delano, who has resigned as member of the Federal Reserve Board to enter the army, also has given up his membership on the Capital Issues Committee. A successor will be appointed by President Wilson.

Passes Preferred Dividend

New York State Railways Puts Action Over Pending Result of Its Fare Appeal

The executive committee of the New York State Railways, Rochester, N. Y., on June 14 decided not to declare at this time the regular quarterly dividend of 1½ per cent, due on July 1, on the \$3,862,500 of cumulative preferred stock. Horace E. Andrews, president of the company, in a circular dated at New York, June 18, says in substance:

"The executive committee was obliged to pass the preferred dividend because of insufficient earnings. The preferred dividends, however, are cumulative and must be paid before any dividends are declared on the common stock. The gross revenues have decreased and the operating expenses have greatly increased and the situation has reached a point where an increase in the rate of fare has become an absolute and immediate necessity. Our position is similar to that of other electric railways and also like that of the steam railroads until the government assumed control and established an average increase of approximately 25 per cent in freight and passenger rates.

"A year ago we applied to the Public Service Commission for permission to increase the fare from 5 cents to 6 cents in the cities in which we operate. Before the case could be heard an injunction was obtained restraining the commission on the ground that it had no power to increase the rate beyond that fixed by franchise or agreement, which contention the Court of Appeals later upheld. Your company has, therefore, made application to the City Councils of Rochester, Syracuse and Utica for authority to increase its rate of fare.

"Due to the increased cost of living, the operating employees last month demanded an increase in their rate of

wages, resulting in a cessation for two days of the operation of the company's cars. An adjustment finally resulted in an increase in the rate of wages upon an understanding with the cities that relief would be granted the company if an examination of its books developed the need of it. An examination by certified public accountants has been under way for about three weeks, and it is hoped the examination will be completed shortly after this month."

Financial News Notes

Sale Under Foreclosure Postponed.—The sale of the properties of the Kansas City, Outer Belt & Electric Railway, Kansas City, Mo., scheduled to take place at Kansas City on June 18, was postponed by Judge John C. Pollock of the United States District Court.

Would Issue \$100,000 of Bonds.—The Hagerstown & Frederick Railway, Hagerstown, Md., has applied to the Maryland Public Service Commission for authority to issue \$100,000 of bonds, of which amount \$35,000 will be used for refunding, and the balance to guarantee a loan of that amount.

\$7,750,000 Kansas City Railways Notes.—The Kansas City (Mo.) Railways has sold \$7,750,000 of three-year 7 per cent collateral notes, Series A, to a syndicate of New York and Chicago bankers. The notes are secured by the deposit with trustees of \$10,134,000 first mortgage 6 per cent bonds, due in 1944.

Interstate Again Passes Preferred Dividend.—The directors of the Interstate Railways, Camden, N. J., have again passed the 3 per cent semi-annual preferred dividend. As was the case six months ago, when the preferred dividend was omitted, several of the leased companies have failed to pay their rental.

Puts Dividend Action Over.—The directors of the Youngstown & Ohio River Railroad, Leetonia, Ohio, on June 25 deferred action on the dividend of both the \$1,000,000 of outstanding common stock, and on the \$1,000,000 of outstanding 5 per cent cumulative preferred stock, usually due at this time. The preferred disbursement, usually payable in April, last, was postponed this year till May 15. The road is classed as a short-line railroad. It is under federal control.

Bondholders Buy Cincinnati Suburban Road.—On June 26 Common Pleas Judge Wade Cushing approved the sale of the property of the Cincinnati, Milford & Loveland Traction Company to the bondholders' committee for \$136,000. Before its future can be determined the Public Utilities Commission will have to act upon its application to abandon its line. L. M. Goldman & Company,

junk dealers of Danville, Ill., offered to make a higher bid on the property, but the conditions were such that the court could not consider them.

Delving Into the Past.—The officers of the North Kankakee Electric Light & Railway Company, Kankakee, Ill., have received notice to appear before the Illinois Public Utilities Commission and explain why a stock dividend was paid without securing permission of the commission. The stock dividend was voted about three years ago. The officers of the company say they took all necessary steps suggested by their attorneys. They did not understand that the permission of the commission was necessary. The company was capitalized for \$100,000. The paid-in capital was \$33,000 and an equal amount of bonds had been sold. After the bonds were paid off the stockholders voted to issue stock to the full amount of the capital authorized. Each stockholder received three shares of new stock for each share that he held previously.

Connecting Railways Passes Preferred Dividend.—The committee of trustees of the Chicago City & Connecting Railways, Chicago, Ill., has passed the dividend on the preferred shares. Members of the collateral trust committee said that there was no probability of the dividend question being considered again until December, when a vote on the January payment is due. The dividend on the preferred stock is cumulative to the extent of \$4.50 a year. This is the first time a dividend was ever entirely passed. Including the July payment of this year there is an accumulation of \$8.50 of dividends due. In January, 1918, \$1.50 was paid. Three per cent was paid in 1917, 3½ per cent in 1916, and \$2.50 in 1915. The last year in which the full \$4.50 dividend was paid was 1913, and the last full semi-annual dividend was July, 1914. Nothing has been paid on the common stock since July, 1912.

Scranton & Binghamton Bondholders Organize.—At the instance of bondholders of the Scranton & Binghamton Railroad, Scranton, Pa., G. Tracy Rogers, Binghamton, N. Y., formerly president of the Binghamton Railway, has consented to organize a bondholders' protective committee to conserve the interests of the bondholders on account of the fact that the company defaulted in the payment of interest due on June 1. The committee is made up of G. Tracy Rogers; H. G. Dunham, president of the People's Savings Dime Bank, Scranton; F. W. Wollerton, president of the Union National Bank, Scranton; William L. Foster, president of the Miners Bank, Pittston, Pa.; W. L. Connell, president of the Connell Coal Company, Scranton; F. L. Fuller, president of the Remington Railway Company; G. R. Bedford, Wilkes-Barre, attorney for the committee. Ford, Bacon & Davis, New York, will make a survey of the property.

Empire United Reorganization Echo.—The Rochester & Syracuse Railroad, Syracuse, N. Y., on June 27 filed with the Public Service Commission for the Second District, a petition asking for the vacating of an order granted by the commission on Oct. 28, 1915, merging the Empire United Railways, Inc., with the Monroe County Electric Belt Line Company. The petition recites that the Empire United Railways, Inc., was authorized to purchase the outstanding capital stock of the Monroe County Electric Belt Line and effect a merger. After the proceedings were commenced to merge the two companies, the Columbia Trust Company, New York, as trustee for mortgage bondholders, commenced an action to foreclose a mortgage given to it by the Rochester, Syracuse & Eastern Railroad to secure the issue of its first mortgage bonds for \$7,500,000 and it was stated in the complaint that the property claimed to be owned by the Monroe County Electric Belt Line Company was

actually owned by the Rochester, Syracuse & Eastern Railroad and subject to the lien of the mortgage. Judgment was entered declaring title to be in the Rochester, Syracuse & Eastern Railroad, and the property of the Rochester, Syracuse & Eastern Railroad, together with the Monroe County Electric Belt Line, was sold under a judgment subject to the lien of the Columbia Trust Company's mortgage.

Would Divide Released Depreciation Fund.—Holders of income 5 per cent bonds of the New York (N. Y.) Railways have organized under the lead of John Candler Cobb, Boston, Mass., for the purpose of bringing action to require the company to distribute to holders of income 5s the reserve fund which was recently released by decision of the Court of Appeals in favor of the company against the Public Service Commission of the First District. As of June 30, 1917, the depreciation or accrued amortization of capital amounted to \$3,127,258, equivalent to 10.20 per cent on the outstanding adjustment income bonds. The New York Railways is the successor to the reorganized Metropolitan Street Railway. The new company was required, before paying any interest on its income bonds or dividends on its stock, to set aside each month 20 per cent of its gross operating revenue for maintenance and depreciation and, if this was not expended during the month, to credit the unexpended amount to an account called "Accrued Amortization of Capital." The company objected to the order on the grounds that the commission was without power to make it; that the required reservation was not always needed in full for the purposes designated and that the directors were the proper persons to determine the depreciation rate and amount of reserve. The court proceedings which resulted finally in releasing the accumulated depreciation fund were reviewed in the ELECTRIC RAILWAY JOURNAL of June 1.

Electric Railway Monthly Earnings

CITIES SERVICE COMPANY, NEW YORK, N. Y.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., May, '18	\$1,925,285	\$38,361	\$1,886,924	\$5,898	\$1,881,026
1m., May, '17	1,565,425	28,341	1,537,084	234	1,536,850
12m., May, '18	20,487,577	390,023	20,097,554	8,297	20,089,257
12m., May, '17	15,210,272	287,038	14,923,234	42,624	14,880,610

CLEVELAND, PAINEVILLE & EASTERN RAILROAD, WILLOUGHBY, OHIO

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Apr., '18	\$41,373	\$28,571	\$12,802	\$11,570	\$1,232
1m., Apr., '17	45,089	23,870	21,219	12,515	8,704
4m., Apr., '18	159,795	110,254	49,541	45,631	3,910
4m., Apr., '17	152,142	91,916	60,226	46,778	13,448

GALVESTON-HOUSTON ELECTRIC COMPANY, GALVESTON, TEX.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Apr., '18	\$205,081	\$136,577	\$68,505	\$39,728	\$28,777
1m., Apr., '17	150,698	106,371	44,327	37,295	7,032
4m., Apr., '18	2,265,272	1,482,279	782,993	460,092	322,901
12m., Apr., '17	1,952,355	1,259,273	693,082	440,411	252,671

HOUGHTON COUNTY TRACTION COMPANY, HOUGHTON, MICH.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Apr., '18	\$25,900	\$16,396	\$9,504	\$4,010	\$4,494
1m., Apr., '17	31,536	16,091	15,445	5,123	10,320
12m., Apr., '18	340,899	217,869	123,030	60,810	62,220
12m., Apr., '17	338,476	196,272	142,204	62,621	79,583

INTERBOROUGH RAPID TRANSIT COMPANY, NEW YORK

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., May, '18	\$3,524,432	\$2,002,462	\$1,521,970	\$1,186,854	\$335,116
1m., May, '17	3,511,496	2,171,239	1,340,257	1,023,779	316,478
11m., May, '18	37,208,118	20,913,024	16,295,094	12,366,041	3,929,053
11m., May, '17	36,608,909	17,271,219	18,337,690	11,043,410	7,294,280

PUGET SOUND TRACTION, LIGHT & POWER COMPANY, SEATTLE, WASH.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Apr., '18	\$903,655	\$565,868	\$337,787	\$206,587	\$131,200
1m., Apr., '17	754,687	460,884	293,803	191,025	102,778
12m., Apr., '18	10,122,652	6,306,622	3,816,030	2,412,336	1,403,694
12m., Apr., '17	8,371,266	5,244,370	3,126,896	2,241,688	985,208

SAVANNAH (GA.) ELECTRIC COMPANY

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Apr., '18	\$92,579	\$62,704	\$29,875	\$24,746	\$5,129
1m., Apr., '17	76,968	51,554	25,414	23,908	1,506
12m., Apr., '18	1,035,134	694,962	340,172	294,204	45,968
12m., Apr., '17	867,963	574,882	293,081	285,198	7,883

TAMPA (FLA.) ELECTRIC COMPANY

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Apr., '18	\$84,863	\$48,347	\$36,516	\$5,085	\$31,431
1m., Apr., '17	82,261	47,183	35,078	4,372	30,706
12m., Apr., '18	997,955	574,859	423,096	59,265	363,831
12m., Apr., '17	863,651	537,088	446,563	52,305	394,258

REPUBLIC RAILWAY & LIGHT COMPANY, YOUNGSTOWN, OHIO

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., May, '18	\$469,142	\$338,765	\$130,377	\$100,034	\$30,343
1m., May, '17	371,745	257,291	114,454	82,638	31,816
12m., May, '18	5,394,109	3,775,786	1,618,323	1,090,939	527,384
12m., May, '17	4,728,747	3,263,123	1,465,624	895,941	569,683

TWIN CITY RAPID TRANSIT COMPANY, MINNEAPOLIS, MINN.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., May, '18	\$804,783	\$536,420	\$268,363	\$160,777	\$107,586
1m., May, '17	841,764	531,928	309,836	149,942	159,894
5m., May, '18	4,039,141	2,972,722	1,066,419	782,468	283,951
5m., May, '17	4,322,748	2,865,833	1,456,915	730,414	726,501

* Includes taxes. † Includes non-operating income. ‡ Includes accruals under rapid transit contracts with city payable from future earnings.

Traffic and Transportation

Freight Rate Hearing

Indiana Electric Roads Appeal for Freight Rates Similar to Those of Steam Lines

Hearings on the petitions of Indiana interurban railways for an increase in freight rates to place their tariffs on a parity with those now in effect on the steam railroads were held before the Public Service Commission of Indiana on June 26 and 27. The following roads were represented at the hearing:

Indianapolis & Cincinnati Traction Company.
Evansville, Suburban & Newburg Railway.
Evansville Railway.
Fort Wayne & Northern Indiana Traction Company.
Chicago, South Bend & Northern Indiana Traction Company.
Winona Interurban Railway.
Terre Haute, Indianapolis & Eastern Traction Company.
Union Traction Company of Indiana.
Marion & Bluffton Traction Company.
Ohio Electric Railway.
Interstate Public Service Company.
Indianapolis & Louisville Traction Company.
Chicago, Lake Shore & South Bend Railway.
Indiana Railways & Light Company.
Fort Wayne & Northwestern Railroad.

ELECTRICS GET UNDESIRABLE BUSINESS

According to the testimony introduced, if the interurban freight rates continue to be lower than those of the steam railroads a great volume of undesirable business would be attracted to the interurbans. It was pointed out that the electric roads were not generally equipped to handle the bulky and heavy freight business, and that such business was not profitable to them. The interurban companies are doing an express business at freight rates. While the higher freight rates were needed on the interurban lines to produce additional revenue it was also necessary that the rates should be as high as those of the steam roads, so that the heavy freight matter would continue to be handled by the latter.

Chairman E. I. Lewis of the commission called the attention of the electric railway men to the likelihood of numerous motor transportation fleets if interurban rates were raised to a point where the gasoline trucks could compete vigorously on light freight. As a means of shunting off the lower classification freight, for example that in the last three classes, he inquired about the advisability of making the rates for classes 1, 2 and 3 prevail for classes 4, 5 and 6. It was agreed it would be hard to predict the results of such a change.

A rather typical case of the conditions of many of the Hoosier electric lines was displayed in that of the Evansville Railways, which handles mostly a freight business. W. A. Carson, vice-president and general manager, testified that his road had not paid dividends on either preferred or common stock since it was constructed in 1907. Each year the deficit grew larger and the road had not met interest on its bonded indebtedness for a year and a half. The net earnings decreased 59 per cent last year.

Suggestions that steam lines handle heavy freight and leave interurbans the lighter class of short-haul freight were made for consideration when conditions make such changes possible.

The hearing is more or less preliminary in character as the commission will look into the public records in this and other interurban cases before granting the increases asked. It is said that the electrics are courting federal control in that some of them have asked the Interstate Commerce Commission to take a hand in obtaining for them the higher intrastate rates desired.

Working to Better the Service

The Kansas City (Mo.) Railways has made some progress on each of the three measures which it is advocating as a solution of the problem of better service. The board of control of the company has made up a complete list of all stops to be made under the proposed skip-stop plan. According to this system the average distance between stops will be 600 ft., thus eliminating 1400 stops and providing for a 38 per cent saving. A list of the stops and an explanation of the proposed change are printed for every line in the city and copies placed in the cars for the information of the public. The schedule was published in one of the newspapers.

The continued advertisement of the "shop early" measure has resulted in considerable relief during rush hours. Women seem to realize that it is to their own advantage and comfort as well as to that of the company and business people to shop between the hours of 9 a. m. and 4 p. m. and arrange their plans accordingly.

The company has continued its study of the industrial situation with a view to getting the staggered work-hour plan adopted by industrial plants and department stores. A complete list of the firms, together with the number of employees in each establishment, has been obtained, and the company is endeavoring to prepare a work-hour schedule for all of its many lines for the purpose of lessening the rush-hour jam.

All Missouri Pleads

With P. J. Kealy as Spokesman Utilities There Place Their Case Before Missouri Commission

A plea for higher rates and for other relief from war-time burdens was made to the Public Service Commission of Missouri last month by representatives of many utility corporations in Missouri, including the heads of large utilities of St. Louis, except the United Railways. That company recently obtained an increase of from 5 to 6 cents in fares.

P. J. Kealy, president of the Kansas City Railways, the principal speaker, suggested four remedial measures, which, he said, when applied by the commission to the utilities, would give relief. A summary of them follows:

FOUR REMEDIES SUGGESTED

1. Request to municipal authorities to relieve the utility from franchise provisions requiring extensions and improvements when not necessary to maintain the present standard.
2. Relief of utilities from all taxes except the general property tax. This would include special impost, car, motor, gross income, street cleaning and sprinkling, park and paving taxes.
3. To require monthly reports of all public utilities touching their earnings and disbursements so that speedy relief may be given when the earnings fail to give a fair return.
4. Elasticity of rates to be granted through definite procedure so that they may be changed to meet the varying costs of fuel, money, labor and materials.

The resolutions adopted in May at St. Joseph by the Missouri Association of Public Utilities, asking that the utilities be granted increased rates in order to meet the increased cost of operation, were presented by a committee.

CLOSER PUBLIC RELATIONS DESIRABLE

In his address Mr. Kealy pleaded for closer co-operation between the utilities, the public and the Public Service Commission. He gave a detailed account of the conditions confronting the various utilities and declared that relief was necessary if they were to exist. Mr. Kealy said in part:

"Conditions are rapidly shifting. No one can predict to-day what six months will disclose. There must be that close co-operation between the public, the regulatory bodies and the public utilities which will admit of prompt action on the part of you gentlemen, backed by the active support of our local councils and the public.

"It is not a theory that confronts us. The utilities of Missouri are at this time facing bankruptcy. In all justice the men who have invested their money in this State should not be asked to pay for the privilege of serving the communities of Missouri with public service. Nor can they longer continue to do so."

Six-Cent Fare for Kansas City

Brief Review of Decision by Missouri Commission Allowing Flat Increase Over Fare Fixed in Model Franchise

The Public Service Commission of Missouri on June 22 granted a 6-cent fare in Kansas City, Mo., to the Kansas City Railways.

COMMISSION DIVIDED THREE TO TWO

The opinion was written by William G. Busby, chairman of the commission; and concurred in by Edward Flad, engineer, the member who had closely investigated the problems of the company, and by Noah W. Sumpson. Two members, E. J. Bean and David E. Blair, dissented. They held that the commission had no authority to handle such rate matters.

As noted briefly in the *ELECTRIC RAILWAY JOURNAL* of June 29, the 6-cent rate is to go into effect on July 15 for a year. At the end of the year the commission will continue the higher rate if still necessary or make other adjustment; intermediate adjustment may also be made.

CHILDREN'S TICKETS AND TRANSFERS UNDISTURBED

Under the decision, the company will continue to give universal transfers. The fare for children will continue at 2½ cents. The commission suggests that the company issue coupon books, or disks, for the convenience of the public. The company now has in circulation metal disks for half fares, and a small number of metal disks for full fare.

Pending the arrival of disks, the fare machines on the cars will be adjusted to receive pennies, though the machines will not count the pennies. The conductors will, possibly, be charged 6 cents for each nickle registered, so that they would be careful to see that the extra penny is deposited. Fares paid wholly in pennies would be registered on the overhead register.

INCREASE APPLIES ONLY IN MISSOURI

The fare increase applies only to Kansas City, Mo. The company has applied to the Kansas Utilities Commission for an increase for the business on the Kansas side. Pending action, an extra cent will be collected from 5-cent passengers boarding cars in Kansas City, Kan., for Kansas City, Mo., when the cars reach the State line. Passengers from Kansas City, Mo., will of course have paid 6 cents for their ride, whether intrastate or interstate.

Following the application before the Kansas commission, the city of Kansas City, Kan., secured from Judge E. L. Fischer in the district court of Wyandotte County a temporary injunction based on the contention that the commission had no jurisdiction. The commission's attorney is fighting the injunction. A hearing on whether the injunction will be dissolved or made permanent was set for June 29.

The company promised its employees that if the fare increase were granted,

wages would be raised not less than 5 cents an hour. The matter of wage adjustment is now being worked out. The new wages probably will be established about Aug. 17, the date of last year's readjustment. The employees are asking an increase in excess of 12 cents an hour. Probably all employees receiving less than \$1,800 a year will share in the advance.

CRITERION FOR OTHER CASES

The action of the Missouri commission is taken as a reflection of the present Missouri position with reference to utility properties—that the public has learned the lesson that it needs the service of utilities, and is willing to pay the reasonable cost. The definiteness of this public opinion may be credited to the efficient publicity by the utilities of the State. The Kansas City Railways and the Kansas City Light & Power Company have presented their situations openly and clearly to the public, through the newspapers of the section, and by direct advertising means. In this work *The Railwayman*, published by the Kansas City Railways for distribution among its patrons, was a potent factor.

APPLICATION PENDING SINCE FEBRUARY

The petition of the company to increase fares was filed with the commission on Feb. 14. The company said that the terms of its franchise with the city had been lived up to scrupulously for three years, but that on account of the conditions imposed by the war it would be impossible with a fare limited to 5 cents to give the city the full advantages of the franchise provisions, make additions and improvements and allow the company to earn interest upon the money invested. It said that after the return to anything like pre-war conditions it would again be possible to carry out the provisions of the franchise with the passenger revenue based upon the 5-cent fare. The relief sought was to continue only so long as the commission determined the increase to be necessary to meet the present abnormal situation. It appealed, therefore, to the commission "to make a reasonable increase in fare . . . to be applied solely to the payment of the increased expenses necessary to render first-class service."

HEARINGS BEGAN IN APRIL

The evidence was heard by the entire commission on April 29 and 30 and on May 9 and 10 at Kansas City and on May 27 at Jefferson City. The case was also briefed and argued by counsel for Kansas City and for the company.

The city contended that the Public Service Commission had no jurisdiction to regulate rates, the routing and the service of the railway and that the full power to regulate such rates, routings

and service was vested in the law-making authorities of Kansas City. It also contended that any attempt upon the part of the commission to change or modify the provisions of the franchise contract would be in excess of the power of the commission and would violate the constitution of the United States and the rights of Kansas City. In other words, the city contended that the State, by constitutional, statutory and charter provisions, surrendered its power and authorized the city and company to fix irrevocably such rates by the franchise agreement so that the power of the State could not be resumed and exercised without the consent of the city during the thirty-year period of the franchise.

In its decision the commission said it held in the case of the appeal of the United Railways, St. Louis, for an increase in fare that to construe the constitution authorizing the city by its ordinance to fix irrevocably the rates for the franchise period would be to construe that section as in conflict with the other provisions of the constitution which reserve the legislative and police powers to fix rates to the State and provide that the charters of the cities shall always be in harmony with and subject to the constitution and laws of the State. In this connection it said:

"That our construction of Sec. 20, Art. XII, was correct in the St. Louis case, *supra*, and the Knight case, *infra*, not only appears from the many decisions cited in our reports therein, but has since been demonstrated by two decisions of the Supreme Court of this State. *State ex rel. City of Sedalia v. Pub. Serv. Com.*, as yet unreported; *City of Fulton v. Publ. Serv. Com.*, as yet unreported. While Sec. 20 of Art. XII was not directly involved in these cases, yet we think that the reasoning of the court therein shows the correctness of our decision in the St. Louis case."

FIVE-CENT FARE INADEQUATE

In conclusion the commission said:

"We therefore conclude from the evidence before us that the maximum rate of 5 cents chargeable by the company for transporting adult intrastate passengers within the limits of Kansas City, Mo., is insufficient to yield reasonable compensation for the service rendered and is unjust and unreasonable; and, having due regard, among other things, to a reasonable average return upon the value of the company's property actually used in the public service, and to the necessity of making reservation out of income for surplus and contingencies, the company will be permitted hereafter to charge for the period fixed in the order, as just and reasonable maximum rates for the service performed, a fare of 6 cents for transporting adult intrastate passengers, and the present fare of 2½ cents for children in Kansas City, Mo. "We estimate that an increase of the Missouri intrastate adult fare to 6 cents will increase the revenue \$841,190,

which amount added to \$680,057, shown above, will make the estimated net income \$1,521,248 on the Missouri intrastate business. This amounts to a 6 per cent return on about \$25,000,000 without allowance for contingencies or an increase in wages.

"The zone system of rates is considered by some to be more equitable than the flat rate, in that the fare in the former instance is approximately proportional to the distance traveled. However, taking the community as a whole, it is very doubtful if the zone system of fares would be desirable. It would entail considerable adjustment of real estate values, change in living conditions, congestion in the inner zone, and additional expense for the company.

"A charge for transfers will not raise sufficient revenue, and it is considered advisable to retain the universal free transfer privilege.

"The company will be required to issue coupon books or metal disks for the convenience of the public, without change of rate, to avoid delay and confusion arising from making change. The commission will require the company to submit monthly statements setting forth full information upon revenue and expense during the month, for the purpose of controlling the situation for the benefit of the public.

"The commission will reserve full jurisdiction of every phase of this case and will reserve the right to modify any order entered herein, including the rate of fare herein allowed, whenever changed conditions shall justify.

"An order will be entered in conformity with these views."

New Albany Fare Order Modified

The Public Service Commission of Indiana recently authorized the Louisville & Southern Indiana Traction Company, which operates the city lines in Jeffersonville and New Albany, to charge 5 cents straight for each passenger carried, instead of selling six tickets for a quarter. The commission also authorized the company to discontinue giving transfers to the city cars from the interurban cars coming into either city, although the city transfers were not discontinued, and permitted the company to charge a 10-cent single fare between New Albany and Jeffersonville, with commuters' tickets to be sold at 7 cents each, or twenty-five tickets for \$1.75.

C. L. Jewett, head of the New Albany city law department, sent a telegram to the commission, asserting that the ruling was oppressive and unfair to the residents. He recently received the following reply:

"On your motion we have suspended the abolishment of the Jeffersonville transfers. We also concur in your suggestion that the purchase of twenty-five tickets at one time is excessive and are issuing an order for the selling of twelve tickets for 84 cents. You have done us a favor by bringing these matters to our attention."

Pittsburgh Railways Files Fare Brief

Methods Of Collection—Objections to City's Plan—Results to Be Obtained from Proposed Plan

On June 17 the Pittsburgh (Pa.) Railways filed a brief in answer to the fare increase proposal made by the city of Pittsburgh, as mentioned in the issue of the ELECTRIC RAILWAY JOURNAL of June 15, page 1168. The brief begins by outlining the proposed methods of collection of fares, as described elsewhere in this issue, and continued in part as follows:

COMPANY PLAN WILL SECURE THE FOLLOWING RESULTS:

1. It will procure the revenue required to operate the cars.
2. It is simple and easily understood by the public.
3. It enables all doors to be used so that passengers may enter and leave the cars promptly.
4. It greatly simplifies the duties of the conductor.
5. It avoids delays in the congested parts of the city. Any necessary delays due to the collection of fares are transferred to the outer districts where traffic is light.
6. It makes possible the use of the fare box and registers—only one register being used at a time.
7. All doors being used, it more evenly distributes the passengers throughout the length of the car.

WHAT THE CITY PROPOSED

To collect 5 cents for a ride wholly in the 5-cent area; 5 cents for a ride wholly within the railway's 7-cent area and 7 cents for a ride across the line dividing the areas—that is, a ride which extends from one area into the other area.

The testimony indicates that the city has no definite idea how this plan is to be worked out, although Mr. Frank, on the stand, after considerable hesitation, suggested the following as a way in which he thought it might be accomplished.

OUTBOUND TRIPS

On outbound trips the collection of fares in the 5-cent area would be the same as that proposed by the company, namely, collect 5-cent fare from each passenger as he left the car. In the 7-cent area each entering passenger would be handed a metal or other type of check which would permit him to leave the car and pay 5 cents instead of 7 cents.

INBOUND TRIPS

On inbound trips in the 7-cent area, 7 cents would be collected from each passenger as he entered the car. If the passenger left the car, however, in the 7-cent area, the conductor would pay back 2 cents per passenger as he left the car. If the passenger left the car in the 5-cent area, no refund would be given the passenger. In the 5-cent area the conductor would collect 5 cents from each passenger as the passenger entered the car.

OBJECTIONS TO CITY'S PLAN

OUTBOUND TRIPS

(a) Passengers in the 7-cent area could not enter by the front door, for if they did go they could not get check from the conductor. This would render useless the front door in the 7-cent area on outbound trips and would greatly delay the traffic.

(b) The duties of the conductor would be multiplied very much since he would have to deal with the passengers in the 7-cent area when they entered the car and again when they left the car. If there were ten passengers to leave the car and as many to board the car at a stop, the conductor would be required to "give checks to the ten who were taking the car and at the same time collect the fares from the ten who were leaving the car, both lines of passengers passing the conductor at the same time.

(c) The conductor could give a check permitting the passenger to leave the car for 5 cents to any party he might desire to present such check. As a matter of fact, he could also report any 7-cent fare as a 5-cent fare by simply adding one of these metal checks to the fare.

(d) It would be necessary for him to have two registers for use in the 7-cent area and he could ring up any 7-cent fare on the

5-cent register without anyone being the wiser.

INBOUND TRIPS

(a) If the passenger got off in the 7-cent area, the conductor would have to pay the passenger 2 cents as he got off the car.

(b) A passenger in the 7-cent area would have to get off at the rear end of the car regardless of how full the car might be, resulting in delay and confusion.

(c) How would the 2 cents rebate be accounted for? Would it be rung up on a 2-cent register; that is, would we then have three registers on the car, a 2-cent register, a 5-cent register and a 7-cent register?

(d) What would prevent the conductor from selling these 2-cent rebates to himself at 2 cents cash?

(e) If an attempt were made to overcome this by requiring the passenger to drop his rebate check in the fare box as he left the car, what would prevent the conductor from dropping the rebate check in the fare box and charging up the company for 2 cents for a 7-cent passenger whose fare had gone into the box?

The testimony of the city was that there would be some decrease in revenue due to the 5 cents being collected in the 7-cent area. The testimony of Mr. Frank was that his estimate of the decrease was \$175,000 a year. We believe that the decrease in revenue would be very much more than this sum, and it would be multiplied many times if the short rider were to be charged 5 cents on other parts of the system where there would be just as much right for a variation from the 7-cent fare as there would be in the 7-cent Pittsburgh area.

The objections to the various schemes outlined above are operating difficulties which have not been overcome in any city in America. In no city has any such receipt method been adopted where large cars are used and many passengers handled.

All these schemes further have the disadvantage of rendering useless the fare boxes, since at least a part of the fares would either be collected from the passengers by the conductor or some token would be collected, permitting the passenger to ride for less than 7 cents, this token, after all, being the same as money.

If a 5-cent fare is to be allowed a short rider in the 7-cent area, the following inconsistencies will develop.

1. The fare from Wilkinsburg to East Liberty would be 5 cents; the fare from East Liberty to Oakland would be 7 cents, unless the 5-cent limit be moved to the city side of Oakland, when some other community then would have a discrepancy.

2. Moreover, if the short rider in the 7-cent area in Pittsburgh be allowed to ride for 5 cents, then the short rider in Braddock, Homestead, etc., should also have the 5-cent fare, which would very quickly mean that we would be back to the 5-cent fare everywhere excepting for the long rider in Pittsburgh, he being the only 7-cent rider, and instead of getting \$2,500,000 increase in our revenue we probably would not get more than \$1,000,000. After all, an analysis of the Hamilton Avenue line chart shows that a ride from Carnegie Library to the far side of Wilkinsburg would cost approximately 16 cents, and it is surely just as unfair to the short rider to charge only 7 cents for this long, expensive ride as it is to charge the short rider 7 cents for a 5-cent ride in the 7-cent area.

Seven-Cent Fare Allowed

The Public Service Commission of Massachusetts in a twenty-six page finding, dated June 29, has sanctioned a 7-cent minimum rate for the Middlesex & Boston Street Railway, with the abolition of 6-cent tickets, and has approved a 1-cent transfer charge between 7-cent and 8-cent lines, continuing the latter without change. In this decision the commission states that it is far from convinced that the company's proposed tariff plan is superior to the zone method of rate-making adhered to by many of the other large companies of the State. The decision will be reviewed in a later issue.

Buffalo Fares Before Court

Effort to Secure Six-Cent Rate in That City Now Moving Toward Settlement Through Courts

As the result of a decision handed down by Justice Herbert P. Bissell in the Supreme Court of Erie County, Buffalo, N. Y., on July 1, a referendum will be held by the voters of the city to determine whether or not the action of the City Council shall be repealed by which that body voted to suspend the operation of the franchise of the International Railway fixing a 5-cent fare and recommending to the Public Service Commission of the Second District that a 6-cent fare be fixed within the city.

APPEAL HEARD ON JULY 2

An immediate appeal was taken by the International Railway and arguments were heard in the Appellate Division at Rochester on July 2, the last day of the Appellate Court term for the summer. An early decision is expected. Henry W. Killen, of counsel for the International, says that if the Appellate Division affirms the judgment of the lower court, the case will be carried to the State Court of Appeals. This appeal would not act as a stay on the matter of a referendum.

The 6-cent fare question in Buffalo got into the courts as the result of a friendly action started by the International Railway against the city in which the company asked for a writ of mandamus to compel the corporation counsel of the city to execute a stipulation of discontinuance of a proceeding now pending in the Supreme Court of Erie County for a review of the company's special franchise assessment for 1916. The city, under the terms of an agreement with the company at the time the 6-cent question was left with the Public Service Commission for settlement, agreed to discontinue the action. The corporation counsel of the city refused to execute the stipulation until the expiration of thirty days after the adoption of the resolution by the Council. Under a provision of the new city charter, any resolution disposing of property rights of the city, shall not become operative until after the expiration of thirty days, and it shall be reconsidered and submitted to the electors for their approval.

NO PROPERTY RIGHTS DISPOSED OF

The International Railway maintained through its counsel, Thoms Penney, vice-president, and Henry W. Killen, of Penney, Killen & Nye, that no property rights of the city were disposed of in the resolution and that the thirty-day clause and referendum were not effective in the case. A citizens' committee was organized with fifteen members and five lawyers were engaged to co-operate with the municipal authorities in testing the legality of the matter.

The decision of Justice Bissell is based upon the action started by the railway. The court denied the writ of

mandamus asked by the company and incidentally upholds the legality of the action taken by the City Council; holds that the Council's resolution is subject to a referendum and also holds that property rights were disposed of by the city when the 6-cent fare action was taken.

Before a referendum can be held, however, petitions must be filed signed by voters, representing at least 5 per cent of the entire number of votes cast for all candidates for Mayor at the last preceeding election. Petitions have been in circulation since the action was taken by the Council on June 18, and it is stated these petitions now bear more than 10,000 names, about three times the number required by law.

One important point in the court's ruling is the fact that a City Council has the right to agree by resolution to amend a franchise with a railway and can grant the Public Service Commission right and power to fix a higher rate of fare. Without this power, the court holds, the Public Service Commission is without authorization to act. The decision upholds the contention of the city law department and defeats the efforts of the International Railway to secure permission from the Public Service Commission for an order to charge a 6-cent fare immediately pending the commission's investigation and the final determination of what a just and reasonable fare should be.

PRESIDENT CONNETTE SEES POSSIBLE CHAOS

In a statement to the Mayor of Buffalo, E. G. Connette, president of the International Railway, said that if the decision of the Supreme Court of Erie County is upheld by the Appellate Division, it will warrant the directors of the International Railway in withdrawing the wage advance recently granted the company's employees until the final determination of the 6-cent fare controversy. Such action on the part of the company's directors will probably mean a strike of motormen and conductors. The situation would then revert back to the time when the Government sent a representative to Buffalo to bring the company and the City Council into agreement. Following the entrance of the Government into the matter previously the Council approved the resolution which waives the provision of the company's franchise which fixes a 5-cent fare and gives the question of determining a just and proper rate of fare to the Public Service Commission.

Arguing the appeal before the Appellate Division in Rochester on July 2, Henry W. Killen, of counsel for the International Railway, said that if the voters of Buffalo were allowed to vote on the question of affirming the action of the City Council, the 6-cent fare would be overwhelmingly defeated. He

declared that if the question was given to the voters and they decided adversely, war industry in Buffalo would be sorely crippled for a strike of the company's employees would be inevitable. Mr. Killen told the judges there were about 140 industrial plants in the city serving war ends and in these plants are 80,000 men and women who would be affected by a strike. Mr. Killen declared that the wage increase of 8 cents an hour would mean \$800,000 a year to the railway. If there is delay, such as would be occasioned by a referendum, the company could not afford to pay the \$2,000 a day that the raise in wages represents.

New York City Lines Appeal

Surface Lines Included in Old Metropolitan Street Railway System Ask Fare Increase

Frank Hedley, vice-president and general manager of the New York (N. Y.) Railways, on June 27 filed with Mayor Hylan a petition requesting, on behalf of the New York Railways, that for the period of the war and one year thereafter the Public Service Commission be permitted to determine rates of fare on lines of the New York Railways regardless of existing municipal agreements and franchises.

PETITION SHOWS FINANCIAL DEPLETION

The petition filed with Mayor Hylan says in part:

"Since the organization of the New York Railways to date no dividends have been paid upon its stock, and since June 30, 1916, no interest has been paid upon its 5 per cent adjustment bonds. Efficient regulation of public utilities must provide for a fair return to the investors and adequate service to the public.

"The New York Railways has been compelled to meet increases in taxes and increases in the cost of labor and material while its revenues have been decreasing. The period has now been reached where it cannot out of earnings meet its fixed charges prior to its adjustment bonds without any return upon its adjustment bonds or stock.

"Gross receipts have been diminishing, and, based upon the trend, the estimated deficit in the interest on the first mortgage 4 per cent bonds for the year ending June 30, 1918, will be \$67,254. The company, notwithstanding this deficit, will be able to pay the interest due on July 1 out of funds realized from the settlement of the former receivership of the properties. Such funds, however, will not be sufficient to pay the interest on the first mortgage bonds during the six months following June 30, 1918. The service cannot be efficiently maintained without an increase in revenue.

COMPANY AT END OF HOPE

"We are now almost at the end of our resources. The actual figures of our condition and the difficulties that confront us are open for inspection and confirmation, and we ask relief only adequate to meet our necessity."

County Clerk William F. Schneider, in a letter to Mayor Hylan and Theodore P. Shonts, president of the railway, bearing on the question of raising fares, brings up the point, that the subway loses money on the passenger who rides for a long distance, and says that under the zone system the burden would not fall upon the rest of the passengers. In the course of his letter William Schneider said:

"Everyone concedes that the wages of the railway employees must be increased, and it seems equally true that present fares will not permit such increases. It is also important to take into consideration the economic status of those who pay the employee namely, the users of the traction lines, and in justice to all approach this question with an angle of vision taking in both sides. With this in mind, I am suggesting that before deciding upon a general increase to 6 cents for all rides, would it not be advisable first to consider whether it is not feasible to work out a plan of zone charges, thereby bringing up the rides showing a loss to profit rides."

Transportation News Notes

Birmingham Fare Election on July 22.—The matter of a 6-cent fare for the Birmingham Railway, Light & Power Company, Birmingham, Ala., will be submitted to the voters at an election to be held on July 22.

Trainmen Help Auto Crusade.—C. B. Quinn, Commissioner of Fire and Police of Memphis, Tenn., is trying to enlist the co-operation of the employees of the Memphis Street Railway in an effort to stop violation of the auto law.

Would Increase Long Island City Fares.—The New York & Queens County Railway, Long Island City, N. Y., has filed with the Board of Estimate & Apportionment of New York a petition for permission to increase fares.

Wants Six-Cent Fare in Lockport.—The International Railway, Buffalo, N. Y., has filed a petition asking for the approval by the Public Service Commission for the Second District of a 6-cent fare in Lockport. The commission will grant a hearing upon the petition.

Preparing for Traffic Survey at Dayton.—Ross W. Harris, Madison, Wis., was in Dayton, Ohio, on June 28 in conference with City Manager Barlow and Director of Law W. S. McConaughy in regard to the survey he is to make in order to determine whether the electric railways there are entitled to a higher rate of fare.

Wheeling Hearings on July 8.—Hearings will be held at Charleston on July 8 before the Public Service Commission

of West Virginia on the application of the Wheeling Traction Company for permission to increase fares on the lines referred to in the item published in this paper for June 29, page 1256.

Fare Increases Suspended Pending Hearing.—The New Bedford & Onset Street Railway tariff, effective on June 30, and the East Taunton Street Railway tariff, effective on July 1, both proposing increased rates of fare, have been ordered suspended by the Public Service Commission of Massachusetts until Aug. 1, pending a hearing on July 10.

It Costs 5.55 cents for Each Montreal Passenger.—The Montreal (Que.) Tramways Commission has presented a series of statements in support of its conclusion that it will cost 5.55 cents to carry each passenger expected to ride on the lines of the Montreal Tramways in the next twelve months. The commission is expected to announce a new scale of fares shortly.

Wants to Adopt Steam Rates.—The Railway Commissioners held a hearing in Montreal, Que., on June 10 to consider the application of the Montreal & Southern Counties Railway for permission to advance the passenger and freight rates over the company's lines "in the same manner and to the same extent as has been permitted by the board in the case of steam railways."

Raleigh Would Charge Seven Cents.—The Carolina Power & Light Company, Raleigh, N. C., has filed with the Corporation Commission a petition for permission to increase cash fares in Raleigh to 7 cents with four tickets for 25 cents and half fare of 7 cents for the round trip for school children. The present fare is 5 cents with twenty-five tickets for 90 cents and round-trip school tickets for 5 cents.

Five-Cent Fare Again in Des Moines.—The Des Moines (Ia.) City Railway has won temporarily at least its fight for a straight 5-cent fare. After being compelled to restore the sale of tickets for one week the company received authority from the City Council to charge 5 cents and to refuse to sell tickets. The Council action was not unanimous, and the one dissenting member promises further action on fares.

Elmira Suburban Rates Suspended.—Public Service Commissioner Fennell gave a hearing in Elmira on June 24 upon complaint against the Elmira Water, Light & Railroad Company, Elmira, N. Y., over increased rates which the company proposes to make effective between Horseheads and Elmira and between Horseheads and Clark's Glen and Elmira Heights. The commission suspended operation of the rates until July 20 pending the investigation.

Women May Be Used in Quincy.—The Quincy (Ill.) Railway, controlled by the Illinois Traction System, contemplates using women in the train service because of its inability to secure sufficient men to fill the regular schedule. The company operates twenty-two motor cars. It is proposed to use women only

as conductors. A number of applications from women for these positions are now being considered. The same rate of wages will be paid to women as to the men.

Key Route Skip Stops on Survey Basis.—The San Francisco-Oakland Terminal Railways, Oakland, Cal., in introducing the skip stop on its city lines has done so in accordance with careful traffic surveys. Ordinarily this works out to a stop every other block or eight to the mile. The reason for the change and its coming was discussed in *Key System News* and by printed notices in cars. The public has made very little complaint. Various revisions in schedules are in prospect as the result of the skip stop.

Colorado Increase Allowed.—The Public Utilities Commission of Colorado has authorized the Denver & South Platte Railway, Denver, Col., to increase the fare between Englewood and Littleton from 5 cents to 10 cents. Englewood patrons may ride to Prescott, which is half-way between the towns, for 5 cents. Another 5-cent fare will be collected between Prescott and Littleton. Commutation fare books between Englewood and Littleton for twenty-five single fares for \$1.50, with a ninety-day limit, will be issued.

Strict Jitney Regulatory Measure.—Jitneys running on the same streets with electric railway cars must cover the same distance each trip as do the electric cars, according to the jitney ordinance read for a second time by the Council of Sioux City, Iowa, during the week ended June 8. Over the protest of Mayor Short, who claimed that the jitney owners' bond was to be fixed at \$3,000, the Council fixed the bond at \$5,000. The measure was to come up for final passage within a few days. The indications were that it would be passed.

Rate Advance at Byllesby Properties.—Since Sept. 1, 1917, increased rates for utility service have become effective at 297 communities served by the following properties managed by H. M. Byllesby & Company: Fort Smith Light & Traction Company, Mobile Electric Company, Northern States Power Company, Oklahoma Gas & Electric Company, Ottumwa Railway & Light Company, Puget Sound Gas Company, San Diego Consolidated Gas & Electric Company, Tacoma Gas Company and the Western States Gas & Electric Company.

Seeking a Middle Ground for the Jitneys.—The committee recently appointed by Mayor Hansen of Seattle, Wash., to devise a plan for municipal regulation of jitney transportation in Seattle has held its initial meeting. It is intimated by the committee that city regulation would not only result in solving the transportation problem of the city, but might so change conditions that the jitney business would be more profitable for its operators. It is expected that the amount required by casualty companies in payment for bonds may be reduced.

Wants to Increase Suburban Fares.—The Alabama City, Gadsden & Attalla Railway, Gadsden, Ala., has filed a petition with the Public Service Commission of Alabama for authority to increase its rate between Gadsden and Attalla from 10 cents to 15 cents. The petition also asks authority to increase the rate between Gadsden and Alabama City from 5 cents to 7½ cents. The company is not asking at this time for an increase of its rates within the city limits of the three towns, but directs attention to the fact that the increase of 5-cent fares to 6 cents is becoming general.

North Carolina Fare Increase Allowed.—The Corporation Commission of North Carolina has granted the request of the Tide Water Power Company, Wilmington, N. C., to increase fares. The city fares have been increased from 5 cents to 7 cents. The gas rate has been increased from \$1.35 to \$1.65 net per 1000 cu.ft. The round-trip fare from Wilmington to Wrightsville Beach has been increased from 35 cents to 40 cents. The application of the company was noted in this paper for June 1, page 1074.

State-Wide Campaign in South Carolina.—The principal electric railway companies of South Carolina have undertaken a joint campaign of information on the need for increased revenue and modification of franchise restrictions as a result of the increased operating costs. The regulation of fares in South Carolina is a municipal function. The campaign is under the direction of Glenn Marston, New York. It is planned to ask for a joint conference between city officials and public utility executives for the discussion of utility problems and their remedies.

Rate Raise for California Company.—The Central California Traction Company, San Francisco, Cal., has been authorized by the Railroad Commission of California to raise its rates to a level with those ordered for the government-operated carriers. This amounts to 10 per cent on passenger fares and 25 per cent on freight rates. The company was the first of the interurbans in the State of California to apply for rate equality with the government railroads. The San Francisco-Oakland Terminal Railways applied for higher fares before the government rate policy was announced.

West Virginia Interurban Would Increase Fares.—The Charleston, (W. Va.) Interurban Railway has filed application with the State Public Service Commission, in which the company asks to be allowed to increase rates on the Cabin Creek and St. Albans lines. On the Cabin Creek branch, from Charleston to Dana, the company wants to increase rates from 5 cents to 10 cents; on the line running from Charleston to Cabin Creek Junction, from 30 cents to 35 cents. The company wants to increase rates on the St. Albans line, from Charleston to Stop 9, from 5 cents to 10 cents, and from Charleston to St. Albans from 20 cents to 25 cents.

Mayor Takes Broad Attitude on Fares.—Mayor George S. Karb of Columbus, Ohio, is not in sympathy with members of the Council who are opposing a temporary increase in the rate of the fare in order to tide the Columbus Railway, Power & Light Company over until some kind of a new contract is agreed upon for the future. In a letter written to that body, for consideration at its meeting on June 28, the Mayor took the broad view that nothing should be allowed to restrict activities at this time and that special thought should be given to the convenience of workmen in reaching the shops, so that production of war essentials shall not suffer.

Boston & Worcester Presents Its Case.—Pleading that recent increases in expenses, including wages, have made absolutely necessary further increases in fares, officials of the Boston & Worcester Street Railway appeared before the Commission of Massachusetts on June 25 and asked that body to approve a new fare schedule making the basis of fare 2½ cents a mile, an increase of 25 per cent over present fares. It is intended, however, to retain the present fare of 6 cents for single-fare limits. One of the reasons advanced by the company for immediate action is that its employees have asked for an increase in wages, to make their pay equal to that of employees of the Worcester and Springfield systems, recently established by Henry B. Endicott as noted in the *ELECTRIC RAILWAY JOURNAL* for June 22, page 1202.

One-Man Cars for Sheboygan.—The Railroad Commission of Wisconsin has authorized the Eastern Wisconsin Electric Company to operate the cars of the city lines at Sheboygan, Wis., with one man. The hearing of the application of the company was held on May 17. Testimony was presented showing that the net earnings of the city lines had fallen off 54 per cent in the last year. The equipment to be used for the one-man operation is the regular equipment of the company, which is suitable because of the light riding. In discussing the question of steam railroad crossings, the commission stated that a good view of approaching trains could be had by the motorman at all crossings except one if the car was stopped at a reasonable distance from the tracks. The one exception is at the crossing immediately north of the passenger station. The company signified its intention of employing a crossing flagman at this point.

Another Move in Jersey Regulation Case.—Chancellor Walker of the Court of Errors and Appeals of New Jersey has allowed an application made by Arthur F. Egner for a writ of error, carrying the recent decision of the Court of Errors and Appeals in the Atlantic Coast Electric Railway and Bradley Beach case to the United States Supreme Court. The writ was then filed in the United States Court. This is the case in which the Errors Court up-

held the power of the Board of Public Utility Commissioners to abrogate franchise contracts. It involved an order requiring transfers to be issued by the railway. The company contended that was in effect a reduction of fares. The State Supreme Court upheld the inviolability of the franchise contract, but the ruling was reversed by the Court of Errors and Appeals. The case was referred to in the *ELECTRIC RAILWAY JOURNAL* for June 22, page 1208.

Public Willing to Pay the Price.—Mayor Hylan and Comptroller Craig of New York City and Borough President Connolly of Queens discussed the case of the New York & North Shore Traction Company for two hours recently before a crowd that packed the court room in Flushing, Long Island. The company has asked the city to allow it to charge 7 cents instead of 5 cents on its cars between Flushing and Whitestone and Flushing, Bayside and Little Neck. The purpose of the meeting in Flushing was to hear whether the public was willing to pay 7 cents or preferred to have the line abandoned. At the close of the meeting, Mayor Hylan put the question to a vote, and those present voted unanimously to increase the fare to 7 cents. Mr. Connolly explained that the reason the application of the company was before the Board of Estimate was that the Court of Appeals in the so-called Rochester case had ruled that the Public Service Commission had no right to grant an increase of fare and that an increase could only be obtained by a modification of a franchise by the Board of Estimate.

Joint I. T. S.-New York Central Rates.—Establishment of joint rates from the Illinois Traction System to all points on the New York Central Lines is practically certain to follow a temporary report issued by the examiner for the Interstate Commerce Commission who has been hearing the merits of the case. Should the commission's final order follow the recommendations of its examiner the Illinois Traction System will be in position to quote through rates to any point on the New York Central Lines. This will mean that elevators located on the Illinois Traction System and the many other industries in the company's territory will be given an outlet to the Eastern trade territory which they have not hitherto enjoyed, via Illinois Traction and the Big Four Railway. The merits of the case were largely based upon the suit instituted against the Big Four Railway jointly by the Illinois Traction System and the Lourie Manufacturing Company, Springfield, Ill., whose factory is located at Fetzter, Ill., a suburb of Springfield. The order of the Interstate Commerce Commission favored the establishment of joint rates in this particular case and efforts were then made by the Illinois Traction System, with the assistance of the Chamber of Commerce of Springfield, to broaden the order to include joint rates from all points.

Boston Elevated Trustees Organize

Careers of Men Who Have Taken Over Boston Elevated Railway Reviewed Briefly

The trustees appointed by Governor McCall of Massachusetts to manage the Boston (Mass.) Elevated Railway under the recent state control act assembled on July 1 at the company's offices for organization and at once took over the administration of the road's affairs. Former Lieut.-Gov. Louis A. Frothingham was elected chairman of the board and Stanley R. Miller was elected secretary. The other members of the board are William M. Butler, John F. Stevens and Galen M. Stone. The trustees voted to continue in office for the present all the officers and employees of the company, including President M. C. Brush.

The trustees were in session about two hours and a half. It is understood that much of their time was devoted to

in 1911 he served as Lieutenant-Governor, and in the last year ran for Governor, but was defeated. He is an overseer of Harvard College and is president of the Blackstone Savings Bank.

Galen L. Stone is a member of the banking firm of Hayden, Stone & Company, Boston. He is a director of the Boston Elevated Railway, a member of the executive committee of the Massachusetts Electric Companies, and is a director of numerous steamship, coal, textile and industrial-chemical companies.

William Morgan Butler is president of the Boston & Worcester Street Railway. He was educated at Boston University Law School. He served in the Massachusetts House of Representa-

strike prevention work in Massachusetts during the last fifteen months.

Stanley R. Miller was private secretary to Governor McCall, and previously his law partner. He was graduated from the Harvard Law School in 1906. For a time he was in the law office of Fish, Richardson, Herrick & Neave. Mr. Miller was active in the final shaping of the Boston Elevated act in conjunction with the Attorney-General of Massachusetts.

Governor McCall made this statement relative to his selections:

"The making up of this board has been difficult not so much from the number of applicants to select from as from the difficulty of securing the men I wished. I believe the outcome is a good board.

"Mr. Frothingham is a man who will command general respect for his fairness and purpose to do just the right thing. Mr. Stone and Mr. Butler are excellent business men, the one an eminent financier and the other a practical street railway man.

"Mr. Stevens is a representative of labor. It seems to me that when the Commonwealth was appointing a board to operate a great public utility, there should be a man who could take the viewpoint of the men who do the work. I know they will appreciate and recognize him in the work of direction. Of course, Mr. Stevens goes on as a trustee representing all interests under the law. He has done excellent work upon the public safety committee.

"Mr. Miller has been my secretary for three years. He has had much to do in connection with the Attorney-General in the final shaping of the legislation. Methodical and conscientious in the transaction of business, I do not know his superior, and he will be of great use to the board."

Henry B. Endicott said in a statement which he made public:

"May I offer a word of caution to the public? I have had occasion to study this situation. These men are not going to have an easy job—I am sure they realize it—and the public must have patience. There are not going to be any more seats in the cars next month just because these men have been appointed, nor will there be any more seats next winter. There will be just as many straphangers. It is impossible to place orders to-day that will add sufficiently to the equipment so that the public will notice any material benefit for a long time to come. It is just as well for the public to realize that at this time and to prepare to be patient.

"There isn't the slightest doubt, from my investigations, but that fares will have to be raised, and raised very materially.

"There is one thing I am sure these men will do—they will keep the public informed at all times of the exact situation. When the public realizes the situation and the necessity for the different moves I feel sure they will not criticize. It is everybody's duty to give these men all the help possible because they have a hard task ahead of them."



BOSTON ELEVATED TRUSTEES

Front row, seated, left to right—William M. Butler, L. A. Frothingham (chairman), John F. Stevens

Back row, standing, left to right—Galen L. Stone, Stanley R. Miller

matters requiring immediate attention, such as the preparation of the new fare schedule which must be promulgated within sixty days and various labor matters which are to be adjusted with the employees.

The personnel of the board is of much interest. Chairman Frothingham, former Lieutenant-Governor of Massachusetts, is a lawyer by profession. He is a native of Jamaica Plain, forty-six years of age, and was educated at Harvard College and Harvard Law School, graduating from the latter in 1896. For a short time he was private secretary to Congressman W. C. Lovering, and in 1898 was assistant attorney for the Metropolitan Park Commission. In 1901 he was elected to the Massachusetts House of Representatives, and he served four years, the last two of which he was speaker. He was the Republican candidate for Mayor of Boston in 1905. From 1908

tives in 1890 and 1891 and in the State Senate from 1892 to 1895, being president of the latter for the last two years. Mr. Butler is a trustee of the Massachusetts Lighting Companies and is a member of the law firm of Butler, Cox, Murchie & Bacon, Boston. He is president of the Boston & Worcester Electric Companies, a trustee of Boston University, and a director of various insurance, textile and banking organizations.

John F. Stevens is president of the Boston Central Labor Union, a member of the executive committee of the Massachusetts Committee on Public Safety, business agent and president of the Stone Cutters' Union, president of the Building Trades Union, a member of the War Efficiency Committee, and member of the Exemption Board in the Roxbury district of Boston. As an executive member of the Public Safety Committee he has been influential in

Personal Mention

Mr. Weatherwax Elected

Vice-President United Traction Company, Albany, Made President New York Association

H. B. Weatherwax, who was elected president of the New York Electric Railway Association at the Bluff Point convention at its June 22 meeting, entered the electric railway field from the steam railroad side, like a number of other prominent electric railway executives. He is still actively connected with many of the subsidiary corporations of the Delaware & Hudson Company outside of its electric railway enterprises, and although only thirty-six years old is vice-president and director of some seventeen of these companies. Among them are: United Traction Company of Albany and Troy,



H. B. WEATHERWAX

Hudson Valley Railway, Troy & New England Railroad, Plattsburg Traction Company, Chateaugay Ore & Iron Company, Champlain Transportation Company, Lake George Steamboat Company and the Fort William Henry Hotel Company. Mr. Weatherwax was born in Van Etten, N. Y., but spent his early life at Cortlandt, N. Y. His first railroad service was with the New Jersey Central Railroad in its traffic department. He left that company on June 1, 1908, to enter the traffic department of the Delaware & Hudson Company at Albany, first as special agent and then as chief clerk. In June, 1913, he was made industrial agent and a year later became vice-president of several of the subsidiary companies of the Delaware & Hudson Company. Since his entry into electric railway work Mr. Weatherwax has taken an active part in the work of the New York Electric Railway Association, and during this past year has been first vice-president of the association as well as a member of its important committee of ten on ways and means to obtain additional revenue.

A. G. Smith, formerly of the General Electric Company, has been appointed electrical engineer of the Boston & Albany Railroad, with headquarters at Boston, Mass.

Riece Ridgely has been appointed superintendent of the Arkansas Valley Railway, Light & Power Company at Ordway, Col., succeeding H. H. Lyons, who has entered the government service.

Jacob E. Burkley, who was master mechanic of the West Virginia Traction & Electric Company, Wheeling, W. Va., for a number of years, has resigned to engage in work not connected with the railway industry.

F. M. Hamilton, formerly superintendent of the department of accident investigation of the Puget Sound Traction, Light & Power Company, Seattle, Wash., has been appointed assistant to the general superintendent of railways.

E. A. MacMillan, superintendent of the Stroudsburg, (Pa.) Traction Company, has enlisted in the Royal Engineers of the British Expeditionary Force and will proceed to England shortly to enter the officers training corps.

W. H. McAloney, Halifax, N. S., formerly superintendent of rolling stock of the Denver (Col.) Tramway, has been appointed superintendent of rolling stock of the Winnipeg (Man.) Electric Railway to succeed George Garrett, resigned.

James Robinson has been promoted to master mechanic of the West Virginia Traction & Electric Company, Wheeling, W. Va., succeeding Jacob E. Burkley. Mr. Robinson received his training in the Wheeling shops and prior to his promotion was shop foreman.

Obituary

Wilford Phillips, for seventeen years manager of the Winnipeg (Man.) Electric Railway, is dead. In March, 1890, Mr. Phillips accepted a position with the Metropolitan Railway, North Toronto, and remained with the company until July, 1892. He then accepted the position of engineer and superintendent of North Toronto Waterworks & Electric Light Company. In March, 1893, he became engineer of the Niagara Falls, Park & River Railway, and in 1896 was appointed manager of that company. In June, 1900, he resigned, and in August, 1900, he accepted the position of manager of the Winnipeg Electric Railway.

Peter E. Hurley, general manager and purchasing agent of the Trenton & Mercer County Traction Corporation, Trenton, N. J., died on June 26. Mr. Hurley was born in Monmouth County, N. J., fifty-two years ago. He worked on his father's farm for some time and then decided to strike out for himself. He went along the Jersey coast and engaged in the hack business. Later he drove a stage in the city of Trenton on what was known as Wayman's Line, carrying passengers between the City Hall and Riverview Cemetery. He next became a driver on the old horse car line, then the only one in the city, operating between the Clinton Street station and Prospect Street. When the Center Street railway was built many years ago, Mr. Hurley was promoted to the position of superintendent and later was advanced to general manager. When the present interests took charge of the Trenton & Mercer County Traction Corporation Mr. Hurley continued with the company for several months, but resigned owing to ill health. He next entered the contracting business, but two years later returned to the company as general manager. All Trenton knew him as "Pete" Hurley.

Charles B. Fairchild, who from 1889 to 1895 was one of the editors of the STREET RAILWAY JOURNAL and later was a frequent contributor to its columns on technical subjects, died on June 28 at his home in Williamstown, Mass. Mr. Fairchild was born in Berkshire County, Mass., in 1842, and served throughout the Civil War, first for two years in the Twenty-seventh Regiment, New York Infantry, and then in the First New York Veteran Cavalry as first lieutenant. During the first battle of Bull Run he was captured and later spent eleven months in Confederate prisons at Richmond, New Orleans and Salisbury, N. C. After the war he entered and graduated from the State Normal School at Brockport, N. Y., and later became a member of the faculty. He also received the degree of A. M. from Amherst College. Later, for several years, he taught in the public schools of New York City. Mr. Fairchild became interested in railway matters through the invention of a cable railway system which was installed on Asylum Hill, Binghamton, N. Y. While with the STREET RAILWAY JOURNAL he wrote "Street Railways: Their Construction, Operation and Maintenance," for many years the standard treatise on the subject. He was also the author of the "History of the Twenty-seventh Regiment, New York Volunteers," a work of 335 octavo pages. After leaving the STREET RAILWAY JOURNAL, Mr. Fairchild was for a short time connected with the Chicago, (Ill.) City Railway in an advisory capacity. He also invented and developed an emergency brake for electric cars which was put on the market by the Standard Air Brake Company. His son, C. B. Fairchild, Jr., is executive assistant of the Philadelphia Rapid Transit Company.

Construction News

Construction News Notes are classified under each heading alphabetically by States. An asterisk (*) indicates a project not previously reported.

Recent Incorporation

***Sacramento Northern Railroad, Sacramento, Cal.**—Articles of incorporation have been filed in San Francisco by the Sacramento Northern Railroad, which is to take over the Northern Electric Railroad and its subsidiary lines. Capital stock, \$5,200,000. Among the directors are E. D. Sullivan, F. M. McAuliffe, E. K. Pedler and G. S. Sahlender. The company will build 5 miles of standard-gage track from the M Street bridge over the Sacramento River to a point in Yolo County.

Franchises

Sault Ste. Marie, Mich.—A special election will be held in Sault Ste. Marie on July 22 to vote on the granting of a thirty-year franchise to the St. Mary's Traction Company.

Roanoke, Va.—The Virginia Railway & Power Company has received a franchise from the City Council of Roanoke to construct a line on York Street, between Boush and Granby Streets.

Track and Roadway

Anniston & Camp McClellan Transportation Company, Anniston, Ala.—Definite plans have been made for the construction of this company's proposed line from Anniston to Camp McClellan and it is expected that operation of the line will begin about Nov. 1. L. L. Crump, Anniston, secretary. [June 8, '18.]

Municipal Railway of San Francisco, San Francisco, Cal.—The construction of the proposed extension of the Municipal Railway from Church Street to the new government dry dock at Hunter's Point will cost approximately \$613,618, according to figures compiled by M. M. O'Shaughnessy, city engineer, at the request of the public utilities committee of the Board of Supervisors. Only a tentative outline for the construction of this extension is at present before the committee. It contemplates the use of certain United Railroad tracks and the construction of private municipal line tracks from Revere and Hawes Streets to Alford and Fairfax Streets.

Savannah (Ga.) Electric Company.—The right-of-way has been secured for the entire length of the proposed 5-mile

extension to be built by the Savannah Electric Company to Port Wentworth, and it is expected that the line will be in operation some time in August.

Caldwell (Idaho) Traction Company.—Electrification of the Wilder line from Caldwell to Wilder, a distance of 12 miles, will be completed within six weeks by the Caldwell Traction Company. The work will cost about \$40,000. The line was leased from the Oregon Short Line Railroad.

Gary (Ind.) Street Railway.—The Gary Street Railway has under consideration the construction of an extension on Buchanan Street from Fifth Avenue to the bridge connecting with the tracks already installed by the American Sheet & Tin Plate Company to its plant. The cost to the Gary Street Railway is estimated at \$125,000.

Des Moines (Ia.) City Railway.—Patrons of the Des Moines City Railway have petitioned for the abandonment of the double track on West Nineteenth Street and running cars one way on Nineteenth Street and the construction of new track on Twentieth Street for the return trip.

***Columbus, Kan.**—Members of the commercial clubs of Pittsburg, Miami, Picher, Treece and Columbus recently met at Columbus and revived the subject of an interurban line to connect with the Joplin & Pittsburg Railway in Columbus and to extend through the principal mining towns of the Kansas-Oklahoma lead and zinc field and to Miami. A committee was appointed to go over the possibilities of building a line and ascertain the probable cost of the project and also to learn about how much money would be subscribed to stock of the company by each of the towns which would be tapped by the proposed line.

***Indian Head, Md.**—A project is now under way to connect Indian Head, Md., with Washington, D. C., by an electric railway. This will either be built all the way from Washington to Indian Head or from White Plains, Md., to Indian Head, using the Pennsylvania Railroad from Washington to White Plains. Civil Engineer Smith, bureau of yards and docks, Navy Department, 1319 F. Street, N. W., Washington, D. C., has charge of the plans being drawn and they are now waiting an appropriation from Congress to build this road.

Bay State Street Railway, Boston, Mass.—Judge Dodge in the United States District Court recently authorized Receiver Donham of the Bay State Street Railway to borrow \$82,000 from the United States Shipping Board Emergency Fleet Corporation, to be used to provide necessary extensions and improvements for the transporta-

tion of employees engaged at the Fore River Shipbuilding plant.

Southwest Missouri Railroad, Webb City, Mo.—An 18-mile extension will be built by the Southwest Missouri Railroad from Picher to Miami, to cost about \$150,000.

Interborough Rapid Transit Company, New York, N. Y.—Operation was begun on July 1 by the Interborough Rapid Transit Company on its Seventh Avenue subway line from Times Square south to the Battery on the main line and by shuttle from Chambers Street to Wall and William Streets. Operation on the Lexington Avenue line will be begun in about a month. The opening of the Seventh Avenue line is referred to elsewhere in this issue.

Philadelphia, Pa.—Mayor Smith has signed a resolution recently passed by the City Councils, authorizing the cancellation of four subway contracts in Broad, Arch and Locust Streets, which are held by the Keystone State Construction Company. The Mayor, city solicitor and Director of City Transit will make the financial arrangement with the company for reimbursing the contractors for their expense in preparing for completion.

Levis County Railway, Levis, Que.—It is reported that the Levis County Railway has awarded a contract for 200 tons of 60-lb. steel rails and is in the market for 16,000 ties, 70 kegs of track bolts, 300 kegs of track spikes and 2500 continuous rail joints.

Power Houses and Substations

St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo.—Work has been begun by the St. Joseph Railway, Light, Heat & Power Company on the construction of a new substation on Felix Street, between Second and Main Streets, to cost about \$4,000.

Interborough Rapid Transit Company, New York, N. Y.—The proposed extensions and improvements to be made by the Interborough Rapid Transit Company, to provide for which a bond issue for \$37,700,000 is being arranged, include extensions in the power plants, electric substations, and transmission lines of the company, also improvements in existing electrical apparatus, to cost about \$2,391,000; improvements in electric interlocking and other signal apparatus, \$3,371,000; electrical machinery and equipment for substations, equipment for electric transmission and distributing systems, \$7,886,000.

Southern Pennsylvania Traction Company, Chester, Pa.—The contract for constructing a second track on the Chester Pike from Darby to Eddystone, awarded to MacArthur Brothers, New York, by the United States Shipping Board, includes the erection of a new power house.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS

FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES • MARKET QUOTATIONS • BUSINESS ANNOUNCEMENTS

Production of Rails in the United States During 1917

Consumption by Electric Lines 200,000 Tons—Supply Expected to Be Reduced This Year

An analysis of the statistics of rail production in 1917, made by the American Steel & Iron Institute, and embodied in its special statistical bulletin No. 2, bearing date of June 10, indicates that the supply of rails for replacement purposes during the year was above normal. The total production reported was 2,944,161 gross tons or the largest amount since 1913. Of the total, 308,258 tons were light rails, under 50 lb. a yard, while 91,674 tons were girders and high T-rails. Exports were a trifle in excess of 500,000 tons.

The consumption by electric lines, including girder rails, etc., was in the neighborhood of 200,000 tons. The appended tables furnish the details:

In addition to new rails rolled during the year, rails rerolled from defective rails and from old rails. In 1917 the open hearth and Bessemer rails of this description totaled 9007 tons, rolled from old rails, 118,639 tons, making a total of 127,646 tons.

Effect of Steel Order on Stock Accumulation

Necessity of Shoving Orders of War Nature Ahead Affords No Opportunity for Replacing Goods

Now that it is impossible to obtain steel except where the goods are to be used for war work of some nature, a number of problems are arising that require a quick answer. According to a strict interpretation of the ruling, a manufacturer must show a bona fide war order before he can obtain a priority for steel shipment. Priority orders, however, constitute 100 per cent

Price Increases on Railway Accessories and Supplies

Cost of Production and Scarcity of Material and Freight Advance the Primary Causes

Prices in very many lines of electric railway equipment and accessories continue to be revised on higher levels. Material, freight and greater production costs are the primary causes of the new quotations. The manufacturer of a self-lubricating trolley wheel, who has been advancing his prices from time to time, says another increase of at least 10 per cent is almost a certainty in a short while. This manufacturer finds something of a difference between the buying cost of copper and brass and the figures usually quoted for publication; it is much higher. Of course, there is a conceded difference—marked at times—between a casual inquiry for a quotation and when the metals must be had. Nearly every bona-fide buyer has the same experience in a seller's market. On an inquiry for a price on some material it was stated a quotation could not be made before the goods were secured. This now is general practice.

Fabrikoid, extensively used for railway car upholstery—seatings, curtains, etc.—was marked up 10 per cent on June 10. Another 10 per cent advance is expected almost any time by the manufacturers' representatives in this field. A prominent manufacturer of plush for car seatings is now revising his prices on a higher plane, which will be announced shortly. On all other material for seatings and curtains produced by this manufacturer, all prices were withdrawn last week.

An increase of 10 per cent is due to arrive on one well-known make of brush-holders in the near future, owing largely to frequent increases in manufacturing material.

Car ventilators of a certain type, which have had the selling price revised but little in the past year, are about due for a raise. The manufacturer has retained his old list up to the present time because the last production had not been exhausted when the jump in prices on almost everything in the electric railway line came along. He has been notified already that the cost of one part of the device will be from 40 to 50 per cent higher than before and as a matter of fact it has been estimated that the next production will exceed the former lot in cost by fully 40 per cent. As this increase cannot be wholly absorbed the price must of necessity advance. This advance is expected to be 10 to 15 per cent.

TABLE I—PRODUCTION OF RAILS, SHOWING INCREASE BY PROCESSES, 1916-1917

Kinds	1916	Per Cent.	1917	Per Cent.	Increase	Per Cent.
Open-hearth.....	2,269,600	79.51	2,292,197	77.86	22,597	9.95
Bessemer.....	440,092	15.42	533,325	18.11	93,233	21.18
All other.....	144,826	5.07	118,639	4.03	*26,187	*18.08
Total.....	2,854,518	100.00	2,944,161	100.00	89,643	3.14
* Decrease.						

TABLE II—PRODUCTION OF RAILS BY WEIGHT PER YARD, 1902-1917

Years	Under 45 Lb.	45 and Less than 85	85 and Less than 100	100 Pounds and Over	Total Gross Tons
1902.....	261,887	2,040,884		645,162	2,947,933
1903.....	221,262	1,603,088		1,168,127	2,992,477
1904.....	291,885	1,320,677		672,151	2,284,711
1905.....	228,252	1,601,624		1,546,053	3,375,929
1906.....	284,612	1,749,650		1,943,625	3,977,887
1907.....	295,858	1,569,985		1,767,831	3,633,654
1908.....	183,869	687,632		1,049,514	1,921,015
1909.....	255,726	1,024,856		1,743,263	3,023,845
1910.....	260,709	1,275,339		2,099,983	3,636,031
1911.....	218,758	1,067,696		1,536,336	2,822,790
1912.....	248,622	1,118,592		1,960,651	3,327,915
1913.....	*270,405	1,967,315		2,265,062	3,502,780
1914.....	*238,423	3,099,865	868,104	528,703	1,945,095
1915.....	*254,101	3,518,291	742,816	688,995	2,204,203
1916.....	*295,535	3,566,791	1,225,341	766,851	2,854,518
1917.....	*308,258	1,882,673	989,704	763,526	2,944,161

* Includes rails under 50 lb. † Includes 50 lb. and less than 85 lb.

TABLE III—PRODUCTION OF ALLOY-TREATED STEEL RAILS, 1917

Alloys	Total Production	Open-hearth	50 Lb. to 84 Lb.	85 Lb. to 99 Lb.	100 Lb. and Over
Titanium.....	15,273	15,273	535	6,671	8,267
Manganese.....	1,262	1,262			1,262
Total.....	16,535	16,535	535	6,671	9,529

Girder and high T-rails for electric and street railways are included in the figures given in Table I. For recent years the tonnage was as follows: 1912, 174,004; 1913, 195,659; 1914, 136,889; 1915, 133,965; 1916, 127,410; 1917, 91,674 gross tons. The total production of rails as given in Table I includes,

of steel production. Steel will not be shipped, therefore, for the manufacture of stock parts.

To carry this one step further, a manufacturer buying from a fabricator of parts cannot buy parts except for war work. If such be the condition, the manufacture for stock of goods involving steel is forbidden automatically. Such a condition would, of course, defeat the purpose of the government in many instances. In these cases businessmen have suggested that a remedy will soon be found and applied. Generally speaking, however, factories are filled up ahead of capacity and consequently will be able to place orders for steel coincidentally with receipt of order for finished products.

An inquiry last week for a lot of No. 516 double-cotton magnet wire, listed at 39 cents a pound, was answered by a manufacturer this week with a quotation of 45.30 cents a pound, an advance of about 15 cents a pound over list.

Transmission cable, on account of the rising cost of lead, will be marked up from 5 to 10 per cent, going into effect immediately. About a 5 per cent advance was made on rubber-covered wire on June 22 on sizes from No. 14 up to No. 0000. An increase of 3 per cent on crossarms went into effect on June 25.

With the government's restrictive order on the importation of asphalt from Trinidad and Venezuela, no increase in price has occurred, but deliveries are later. Turpentine, used in paints, has been steadily rising in price for several weeks. It is now quoted at 75 cents a gallon, a jump of more than 30 cents in three months.

Reports from Chicago are to the effect that an increase in price on pole-line hardware can be expected shortly although no estimate was made as to the extent of this advance.

Railway Market Still Restricted

Purchasing Agents of Prominent Road Are Directed to Suspend Buying During Summer Months

Electric railways have not been placing orders for needed rolling stock, equipment or accessories in any but a restricted sense for some time. At present they have refrained from buying for their fall requirements beyond the absolute maintenance of their systems or the necessary replacements. Various reasons are ascribed for this curtailment, chief of which, of course, is lack of income and inability to market their securities in order to obtain sufficient working capital.

As a concrete instance of this condition it may be stated that a large Eastern traction system, operating several interurban lines of importance, notified its local purchasing agents that under no circumstances is any material or equipment to be bought for the next sixty days. This period covers the months of July and August. Just why this order was made has not been explained.

Traction Companies Running Behind on Accounts

Supply Concerns Say Bills Are Not Met Promptly—Settlements Deferred—Credits Weakened

A few weeks ago the credit standing and buying power of traction roads were referred to favorably by the *ELECTRIC RAILWAY JOURNAL*. The information was authentic and obtained from the most conservative concerns in the equipment and supply field. For one reason or another, rather difficult to explain, a change has occurred since then. The accounts of electric railways are now reported as not be-

ing settled so promptly. Normally bills were discounted, 2 off ten days, and rarely were more than thirty days required. In many instances accounts are allowed to run sixty and ninety days and sometimes even six months at the present time.

Firms in the supply lines not heavily capitalized are feeling the pinch more keenly than the stronger financed companies, though complaints of deferred payments of bills are general. Concerns which formerly seldom sent out a dozen letters a year asking for remittances to cover current bills, are now obliged to forward reminders monthly. The returns are said to be far from satisfactory.

Where concerns are running behind in their collections additional capital is needed to finance their business, with credits being sharply curtailed besides. One company in this position is of the opinion that with the advance of material and the slow payment of bills there is but one course to pursue. The additional cost cannot be entirely absorbed, but the burden must eventually fall on the purchaser. In other words, the buyer of equipment, supplies, etc., it is stated, will have the charges increased by the sellers in self-defense to make up the deficit, and selling terms will be promptly enforced.

Rolling Stock

Wilmington (Del.) City Railway has ordered twenty-two new double-truck passenger cars from the J. G. Brill Company, Philadelphia, Pa.

Empire State Railway Corporation, Syracuse, N. Y., has purchased a No. 3 snowplow from the Russell Snow Plow Company, via Wendell & MacDuffie, for fall delivery.

International Railway, Buffalo, N. Y., has ordered four snow broom sweeper equipments from the Russell Snow Plow Company, through Wendell & MacDuffie, to be attached to its passenger cars.

United Railways & Electric Company, Baltimore, Md., which is in the market for fifty new double-truck cars of the standard type, has specified that all bids must be placed on file July 5 (yesterday) at noon.

Pacific Electric Railway, Los Angeles, Cal., has placed an order for fifteen additional one-man cars with the American Car Company, St. Louis, Mo. This company had previously bought twenty cars of the same type, as mentioned in the *ELECTRIC RAILWAY JOURNAL* of June 15, making thirty-five in all.

Tampa (Fla.) Electric Company is reported to have received eight new Birney-type cars built by the St. Louis Car Company. Before being placed in operation on the company's Ybor City—West Tampa line they will be equipped with a compressed air device which registers transfers independent

Price of Copper Raised by War Industries Board

Advance to 26 Cents a Pound Granted—Became Effective July 2—Producers' Data Convincing

Contrary to expectation, a new price of 26 cents a pound for copper was fixed by the War Industries Board on Tuesday, taking effect immediately and to remain in force until Aug. 15. This is an advance of 2½ cents a pound from the former price of 23½ cents a pound. An increase of 5 cents a pound was asked by the producers to meet the extra costs of labor, freight and every phase of production where increased expenses due to war conditions have made themselves felt.

An impression prevailed that if a new price were decided upon by the board it would not take effect before the time for a revision of prices, Aug. 1. But the producers were permitted to receive the benefit of the increase by putting the new schedule into effect at once. When Aug. 1 arrives the prices as determined upon on Tuesday again will be taken up for consideration, to ascertain whether the compromise in price is higher than is reasonable or too low to meet expenses and include a fair profit.

of hand power on the part of the motor-man.

Charleston Consolidated Railway & Lighting Company, Charleston, S. C., furnishes the appended specifications for sixteen double-truck center entrance cars, ordered from the Cincinnati Car Company for delivery in August and referred to in last week's *ELECTRIC RAILWAY JOURNAL*:

Number of cars ordered.....	16
Date of delivery.....	August
Builder of car body.....	Cincinnati Car Co.
Type of car.....	Double-truck, center-entrance
Seating capacity.....	56
Weight (total).....	56,000 lb.
Booster centers, length.....	23 ft. 10 in.
Length over bumpers.....	41 ft.
Width over all.....	8 ft. 3 in.
Body.....	All steel
Interior trim.....	Cherry
Headlining.....	Carline finish
Roof.....	Arch
Air brakes.....	Westinghouse A. M. M.
Axles.....	Laclede Steel Co.
Bumpers.....	Rico anti-climber
Conduits and junction boxes.....	Duraclad
Control, type.....	H L D
Couplers.....	Tomlinson, air and electric
Curtain fixtures.....	Curtain Supply Co.
No. 88 ring	
Curtain material.....	Pantasote
Designation signs.....	Keystone
Door operating mechanism.....	National
Pneumatic	
Fenders or wheelguards.....	Company's standard
Gears and pinions.....	Nuttall
Hand brakes.....	Cincinnati drop handles
Heaters.....	Consolidated
Headlights.....	Crouse-Hinds S. D. P.
Journal boxes.....	Symington
Lightning arresters.....	Westinghouse
Motors, type and number.....	Four West. 514, inside hung
Paint, varnish or enamel.....	Flood & Conklin
Registers.....	International
Sanders.....	Ohio Brass
Sash fixtures.....	Cincinnati
Seats, style.....	Hale & Kilburn
Seating material.....	Rattan
Step treads.....	Feralun
Trolley catchers or retrievers.....	O. B. retrievers
Trolley base.....	U. S. No. 14 on motors.
	O B on trailers
Trolley wheels or shoes.....	U. S.
Trucks, type.....	Cincinnati
Ventilators.....	Automatic
Wheels (type and size).....	C I-24 in.

Trade Notes

R. P. Dryer, assistant sales manager of the Canadian Allis-Chalmers Company, Ltd., Toronto, Can., has resigned to take a position in the Pittsburgh (Pa.) office of the Allis-Chalmers Manufacturing Company, Milwaukee, Wis.

J. R. Palmer, who had charge of the line material sales of the Ohio Brass Company, Mansfield, Ohio, for a number of years, is now in Philadelphia, Pa., where he will be engaged in naval airplane productive work.

Railway Improvement Company, New York, N. Y., advises that it has received an order for six Rico coasting recorders from W. R. Grace & Company, New York, for use by the Electric Companies Association, Lima, Peru.

Public Service Railway, Newark, N. J., has placed H-B life guards of the Consolidated Car Fender Company, through Wendell & MacDuffie, its sales representatives, on the thirty-three new cars now under construction by the Cincinnati Car Company.

Perley A. Thomas, manufacturer of cars and car materials, High Point, N. C., writes that he did not take over the car manufacturing plant of the Southern Car Company, as mentioned in a recent note in these columns, but conducts only the Perley A. Thomas Car Works.

Consolidated Car Fender Company, Providence, R. I., through Wendell & MacDuffie, general sales agents, New

York, N. Y., filled an order for twenty-five H-B life guards to be installed in the equipment, now in service, of the Norfolk lines of the Virginia Railway & Power Company, Richmond, Va.

Joseph Leidenger, for many years Eastern sales manager of the Dayton Manufacturing Company, manufacturers of car trimmings at Dayton, was elected vice-president of the company at its last annual meeting. The other officers elected were: John Kirby, Jr., president; Nelson Emmons, Jr., vice-president, and H. D. Hendrick, secretary and treasurer. Mr. Leidenger is a veteran in the car trimming business, having started with Mr. Kirby in the firm of Post & Company in Cincinnati in 1882, and continuing with him when he became associated with the Dayton Manufacturing Company in 1888.

Dwight P. Robinson and John W. Hallowell have retired from the firm of Stone & Webster, as of July 1, and the business will be continued by the remaining partners, Charles A. Stone, Edwin S. Webster, Russell Robb and Henry G. Bradlee. Dwight P. Robinson has been with Stone & Webster since 1893. In 1908, he was elected president of the Stone & Webster Engineering Corporation, and he has been a member of the firm since 1912. John W. Hallowell has been with Stone & Webster since 1901 and a member of the firm since 1912. Since May, 1917, he has been in Washington with Mr. Hoover as a member of the United States Food Administration and expects to continue in that work for the duration of the war.

New Advertising Literature

Sprague Electric Works of the General Electric Company, New York, N. Y.: Circular describing the Sprague type SS flexible-steel conductors.

Ingersoll-Rand Company, New York, N. Y.: The following new publications are being distributed:—Form 4039, eight-page bulletin on Leyner shank and bit punch for punching out holes in bits and shanks of hollow drill steel. Form 901, four-page flyer showing the complete line of "Little David" pneumatic tools. Tables of sizes and capacities are given and illustrations show all the tools and their applications. Form 9028, eighteen-page catalog illustrating and describing equipment for sugar factory and refinery service. A separate Spanish edition of this catalog is also available for those who desire it. Form 9010, four-page catalog on the "Sergeant" ticket-canceling box. Form 901-1, single-page flyer on "Little David" caulking machine. Form 888, four-page flyer on "Little David" evaporator tube, cleaning and other labor-saving pneumatic tools. Form 876, single-page flyer on Ingersoll-Rand barometric condensing plants. Form 883A, single-page flyer on Class "FP" steam engines, horizontal center crank type with piston valves. Form 3015-1, four-page bulletin on "ER-1" portable mine car air compressors. Copies of the publications will be sent free on request.

NEW YORK METAL MARKET PRICES

	June 26	July 3
Copper, Ingots, cents per lb.....	23½	26
Copper wirebase, cents per lb.....	26½	28½
Lead, cents per lb.....	8	8
Nickel, cents per lb.....	40	40
Spelter, cents per lb.....	8.62½	8.87½
Tin, Chinese*, cents per lb.....	92	92
Aluminum, 98 to 99 per cent., cents per lb.....	133.00	133.00

* No Straits offering. † Government price in 30-ton lots or more, l. o. b. plant.

OLD METAL PRICES—NEW YORK

	June 26	July 3
Heavy copper, cents per lb.....	22	22
Light copper, cents per lb.....	19½	19½
Red brass, cents per lb.....	19	19
Yellow brass, cents per lb.....	13	13
Lead, heavy, cents per lb.....	6½	6½
Zinc, cents per lb.....	5½	5½
Steel car axles, Chicago, per net ton....	\$41.32	\$41.32
Old carwheels, Chicago, per gross ton....	\$29.00	\$29.00
Steel rails (serap), Chicago, per gross ton	\$34.00	\$34.00
Steel rails (relaying), Chicago, gross ton...	\$60.00	\$60.00
Machine shop turnings, Chicago, net ton...	\$16.25	\$16.25

ELECTRIC RAILWAY MATERIAL PRICES

	June 26	July 3
Hubber-covered wire base, New York, cents per lb.....	27 to 30	27 to 30
Weatherproof wire (100 lb. lots), cents per lb., New York.....	32.25 to 37.10	34
Weatherproof wire (100 lb. lots), cents per lb., Chicago.....	35 to 35.42	35.00 to 35.42
T rails (A. S. C. E. standard), per gross ton.....	\$70.00 to \$80.00	\$70.00 to \$80.00
T rails (A. S. C. E. standard), 100 to 500 ton lots, per gross ton.....	\$67.50	\$67.50
T rails (A. S. C. E. standard), 500 ton lots, per gross ton.....	\$62.50	\$62.50
T rail, high (Shanghai), cents per lb.....	4½	4½
Rails, glider (grooved), cents per lb.....	4½	4½
Wire nails, Pittsburgh, cents per lb.....	3½	3½
Railroad spikes, drive, Pittsburgh base, cents per lb.....	4½	4½
Railroad spikes, screw, Pittsburgh base, cents per lb.....	8	8
Tie plates (flat type), cents per lb.....	9½	9½
Tie plates (brake type), cents per lb.....	9½	9½
Tie rods, Pittsburgh base, cents per lb.....	7	7
Flah plates, cents per lb.....	9½	9½
Angle plates, cents per lb.....	9½	9½
Angle bars, cents per lb.....	9½	9½
Rail bolts and nuts, Pittsburgh base, cents per lb.....	4.90	4.90
Steel bars, Pittsburgh, cents per lb.....	5	5
Sheet iron, black (24 gage), Pittsburgh, cents per lb.....	4.90	4.90
Sheet iron, galvanized (24 gage), Pittsburgh, cents per lb.....	5.80	5.80
Galvanized barbed wire, Pittsburgh, cents per lb.....	4.35	4.35

	June 26	July 3
Galvanized wire, ordinary, Pittsburgh, cents per lb.....	3.95	3.95
Car window glass (single strength), first three brackets, A quality, New York, discount.....	80%	80%
Car window glass (single strength), first three brackets, B quality, New York, discount.....	80%	80%
Car window glass (double strength, all sizes AA quality), New York discount....	82 & 3%	82 & 3%
Waste, wool (according to grade), cents per lb.....	11½ to 22	11½ to 22
Waste, cotton (100 lb. bale), cents per lb.....	13 to 13½	13 to 13½
Asphalt, hot (150 tons minimum), per ton delivered.....	\$38.50	\$38.50
Asphalt, cold (150 tons minimum, pkgs. weighed in, F. O. B. plant, Maurel, N. J.), per ton.....	\$42.50	\$42.50
Asphalt filler, per ton.....	\$45.00	\$45.00
Cement (earload lots), New York, per bbl.....	\$3.20	\$3.20
Cement (earload lots), Chicago, per bbl....	\$3.34	\$3.34
Cement (earload lots), Seattle, per bbl....	\$3.68	\$3.68
Lined oil (raw, 5 bbl. lots), New York, per gal.....	\$1.60	\$1.62
Lined oil (boiled, 5 bbl. lots), New York, per gal.....	\$1.60	\$1.63
White lead (100 lb. keg), New York, cents per lb.....	10½	10½
Turpentine (bbl. lots), New York, cents per gal.....	70	75

* Government price.

116 Peacocks in Use

More Ordered



The Eccentric
Drum

That's the two-word comment that tells the story of the Peacock Brake on the cars of the Newport News and Hampton Railway Gas & Electric Company.

Ordinarily this Virginia district—as the Old Point Comfort denotes—has very mild winters.

The winter of 1917-1918 was some exception! There was plenty of trouble from frozen air, but the vital service to the great shipyards and other war centers was given in uninterrupted volume because

Cold Never Hampers a Peacock Brake

You've got to have 'em for 100 per cent operating efficiency.

National Brake Company
Buffalo, N. Y.

Bankers and Engineers

SANDERSON & PORTER ENGINEERS

REPORTS • DESIGNS • CONSTRUCTION • MANAGEMENT
HYDRO-ELECTRIC DEVELOPMENTS

RAILWAY, LIGHT AND POWER PROPERTIES

CHICAGO

NEW YORK

SAN FRANCISCO

THE J. G. WHITE COMPANIES

ENGINEERS
FINANCIERS



CONTRACTORS
OPERATORS

43 EXCHANGE PLACE
LONDON

NEW YORK
CHICAGO

THE ARNOLD COMPANY

ENGINEERS—CONSTRUCTORS
ELECTRICAL—CIVIL—MECHANICAL

105 SOUTH LA SALLE STREET
CHICAGO

Ford, Bacon & Davis, Engineers.

115 BROADWAY

New Orleans NEW YORK San Francisco

ALBERT S. RICHEY

ELECTRIC RAILWAY ENGINEER

WORCESTER POLYTECHNIC INSTITUTE
WORCESTER, MASSACHUSETTS



STONE & WEBSTER

Industrial Plants and Buildings, Steam Power Stations,
Water Power Developments, Substations, Gas Plants,
Transmission Lines, Electric and Steam Railroad Work.

NEW YORK

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H. M. Byllesby & Company, Inc.

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CHICAGO
No. 208 So. La Salle St.

TACOMA
Washington

Purchase, Finance, Construct and Operate Electric Light,
Gas, Street Railway and Water Power Properties.

Examination and reports. Utility Securities Bought and Sold.

THE RALPH R. RUMERY CO., INC.

Consulting Engineers

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50 Church Street, New York

WOODMANSEE & DAVIDSON ENGINEERING CO.

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784 Continental & Commercial
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Sloan, Huddle, Feustel & Freeman Consulting Engineers

Analytical Studies of financial and operating conditions,
appraisals and rate adjustments of electric railway and
all public utility properties.

BOSTON, 14 Kilby Street

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S. D. PUGH

CONSULTING ENGINEER and TRACTION EXPERT

Appraisals, Rate Investigations, Interurban and Street
Railways, Traffic Surveys, Financial Reports.

8 EAST LONG ST., COLUMBUS, OHIO

JOHN A. BEELER

OPERATING AND RATE INVESTIGATIONS
TRAFFIC SURVEYS AND SCHEDULES

52. VANDERBILT AVE. NEW YORK
ELECTRIC RAILWAY MANAGEMENT
SUPERVISION OF CONSTRUCTION
ENGINEERING
APPRAISALS

343 District Bldg.
Washington,
D. C.

Scotfield Engineering Co. Consulting Engineers

POWER STATIONS
HYDRAULIC DEVELOPMENTS

PHILADELPHIA, PA.
GAS WORKS
ELECTRIC RAILWAYS

You are a faithful subscriber and reader of the
Electric Railway Journal. You know how useful it is
to you. Why not give us the names of those of your
electric railway friends who would also benefit by being
subscribers to the Electric Railway Journal? We will
be glad to send specimen copies to any names and
addresses that you mention.

ELECTRIC RAILWAY JOURNAL

ELECTRICAL TESTING LABORATORIES

Electrical, Photometrical and
Mechanical Testing.

80th Street and East End Ave., New York, N. Y.

THE P. EDW. WISCH SERVICE

Suite 1710
Park Row Bldg., New York

DETECTIVES

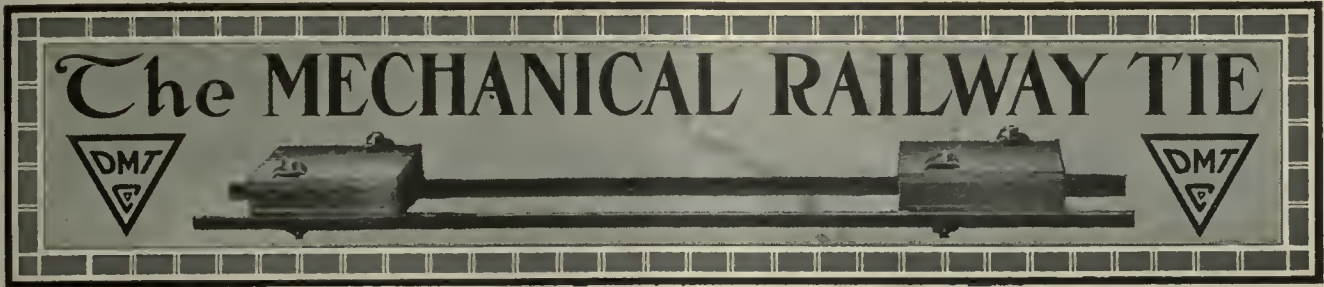
Suite 715
Board of Trade Bldg., Boston

Frederick Sargent
Wm. S. Monroe

A. D. Lundy
James Lyman

SARGENT & LUNDY, Engineers

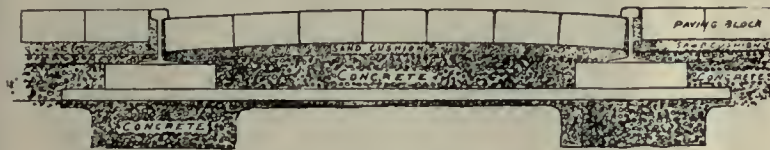
1412 Edison Bldg., 72 W. Adams St., Chicago, Ill.



Cost Comparison

One very strong point in favor of Mechanical Ties is in the cost of installing. Study carefully the figures of comparison. They are conclusive proof of the superiority of

DAYTON MECHANICAL TIES



Excavation for Mechanical Tie

Track Construction

7-in. rail
4½-in. mechanical tie
6 in. x 1 ft. 6 in. for tie foundation
Total excavation for track
11½ in. x 8 ft. 6 in. x 1000 ft. = 302 cu.yd.
6 in. x 1 ft. 6 in. x 2000 ft. = 55½ cu.yd.

Excavation for Paving

4-in. paving block
1½-in. sand cushion
6-in. concrete foundation
Total excavation for paving 11½ in. x
8 ft. 6 in. x 1000 ft. = 302 cu.yd.

Excavation Below Paving Line 55½ yd.

Cost

3-ft. centers

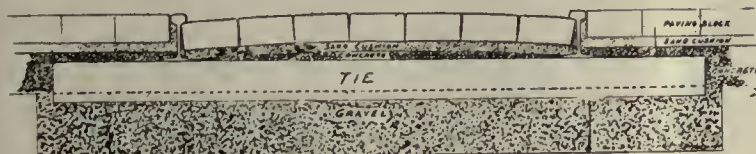
55½ cu.yd. excavation,	\$1.25.....	\$69.88
300 track ties	2.50.....	750.00
33 joint ties	5.75	189.75
55½ cu.yd. concrete	6.00.....	333.00
Labor.....		48.00

\$1390.63

\$1.39 per foot

The figure of \$48 for labor is the actual experience of D. S. & X. S. Ry. Co. in laying track with labor 30 cents an hour.

WOOD TIES IN GRAVEL BALLEST



Excavation for Wood Tie

Track Construction

7 in. Rail
6 in. Tie
8 in. Ballast
Total Excavation For Track:
21 in. x 8½ ft. x 1000 ft. =
55½ cu.yd.

Excavation For Paving

4 in. Paving Block
1½ in. Sand Cushion
6 in. Concrete Foundation
Total Excavation for Paving,
11½ in. x 8 ft. 6 in. x 1000 ft =
302 cu.yd.

Excavation Below Paving Line 249 Cu. Yd.

Cost

2-in. centers

249 cu.yd. Excav.	\$1.25	\$311.25
249 cu.yd. Ballast	1.50	373.50
500 W.O. Ties	1.25	625.00
6 Kegs Spikes	8.00	48.00
Labor		350.00

1707.95

\$1.707 per foot.

Labor of \$350.00 includes laying track, spiking, gauging, aligning and surfacing at 35 cents per foot of track.

Installing Wood Ties\$1.70 per foot
Installing Mechanical Ties\$1.39 per foot
Mechanical Ties Save41c per foot

A saving of nearly 25%—by using Mechanical Ties.

Your inquiry for full particulars regarding Mechanical Railway Ties will be a step in the direction of better economy.

WRITE TODAY

THE DAYTON MECHANICAL TIE CO.

201 Third Street Arcade
DAYTON, OHIO





Typical failure in solid casting at flangeway intersection in crossing.

Plain Crossings

←—————→
Note the Crack

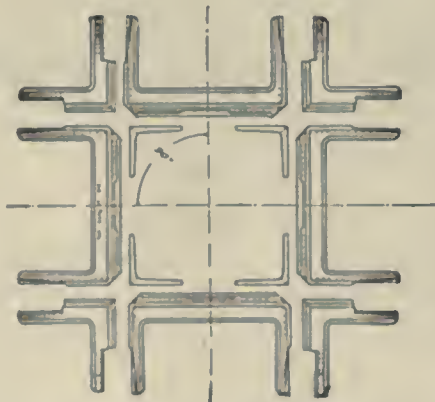
Your own experience with solid crossings tells you that fractures start where the photograph on the left shows. They are caused by lack of flexibility.

Balkwill Crossings

—————→
don't develop such cracks because scientifically designed joints are placed at the very spots where breaks formerly occurred.



Joints in Balkwill Articulated Cast Manganese Crossings are life savers. They positively prevent breakage at flangeway intersections, permitting 100% wear before renewal is necessary



Joints at the flangeway intersections of Balkwill Crossings positively eliminate breakage.

Cast manganese crossings having their flangeway intersections cast solid cost almost as much as BALKWILL ARTICULATED CAST MANGANESE CROSSINGS, but are frequently discarded due to breakage at the flangeway intersections when not more than 25% of their possible wear has been obtained. With the BALKWILL ARTICULATED CAST MANGANESE CROSSINGS it is possible to obtain 100% wear. Therefore, the BALKWILL Crossing actually gives you

**MORE WEAR PER DOLLAR THAN ANY OTHER
CROSSING YOU CAN BUY**

**Order Balkwill Crossings Direct from Your
Special Work Manufacturers**

*Write for detail information and list of installations
Don't accept a so-called substitute, as there is none*

The Balkwill Manganese Crossing Co.

506 Williamson Building, Cleveland, Ohio



This summer we will install Consolidated Heaters in our cars

Our Heating Troubles Last Year Were Expensive!

"Our old heaters caused excessive current consumption and in order to overcome the "knocks" our service suffered we decided to discard them.

"At first we thought this meant a big loss—to rip out old equipment—but that was before we figured on using Consolidated Heaters. *This* winter there'll be a different story about our service. We're going to turn every former knocker into a booster, and save enough current consumption to start paying off a big slice of the cost."

Why They Decided on Consolidated Heaters
Consolidated Car Heaters have ventilated porcelain

cores supporting the coils, allowing air to pass on all sides. This insures quick radiation and keeps the coils at low temperature. Coils are perfectly insulated, and supported continuously to eliminate vibration. Lead wires are at one end of cross-seat heaters, to simplify installation. Weight has been reduced by using steel cases.

There are many other distinctive features that have made Consolidated Heaters standard equipment for railway service. We will be glad to tell you about them.

Makers of the Famous Consolidated Thermostat.

CONSOLIDATED CAR-HEATING COMPANY

ALBANY

NEW YORK

CHICAGO



**Read
What
One
User
Writes
About**



The Bonham Traffic Recorder

"These recorders give us information which enables us to determine at a glance the distribution of travel; showing from and to what stations each passenger rides, enabling us to determine at what points on the lines is the maximum load; and the number of passengers handled to and from any station about which there may be a question.

"In one case we had to cut out stops on some limiteds to enable us to make the time. The record showed the station which had the least travel and exactly the amount of travel each day. This put us in a position to determine whether it would be policy to cut out the stop and also to answer the complaints of the people at that station after the stop was cut out. There is no guess work about the Bonham Traffic Recorder. The data are before you and you can get almost anything you want from it."

The Bonham Recorder Company
Hamilton, Ohio

5c., 6c. or 7c. Fare?

The Johnson Box handles them efficiently



THE advantages of the unit construction of the Johnson Fare Box and its ready adaptability to meet changes in fare conditions again has been demonstrated:

One property with more than 900 of these boxes in daily operation has been granted a fare increase from 5 cents to 6 cents. To take care of this new rate of fare required only slight changes in the standard fare box. These changes were made with little

effort at a cost of less than \$5 per box.

If you have Johnson boxes on your cars, you have no need for worry over means for collecting authorized rate changes, as your present boxes can be altered at nominal cost to meet any condition that may arise.

Whether the rate of fare authorized is 5 cents, 6 cents or 7 cents Johnson boxes will give you Johnson's efficiency and satisfaction.

JOHNSON FARE BOX COMPANY

Jackson Boulevard and Robey St., Chicago

50 East 42nd Street, New York

INTERNATIONAL

Coin Registers and Fare Boxes



Motor-
Driven
Type C25
Coin
and Transfer
Register

Women Conductors

In the transition to Women Conductors the ease of operation and flexibility of our manually operated or motor-driven coin register and fare boxes reduces the nerve strain giving a greater efficiency and permanency in the employment of women.

One problem solved by the International Coin Register and Fare Box is in reducing the time element in fare collection with reduced entrance congestion and thereby improving schedules.

Let us advise with you on your fare collecting systems.

We manufacture Coin Registers, Fare Boxes, Double and Single Car Registers, and fittings, conductors' punches, and are exclusive agents for Heeren Enamel Badges.



Cash Side Type C17
Coin and Metal
Ticket Fare Box

The International Register Company

15 South Throop Street

CHICAGO, ILL.

Around the Continent With Hale and Kilburn

Atlanta Buys the Hale and Kilburn Walkover Seats for Its Latest Trailers

Atlanta has bought several makes of seats in the past, but when it considered its experience with them it decided 'twas worth while to buy more of Hale and Kilburn manufacture.

The style which it has bought last is the No. 400-A Walkover wooden slat type. These will be installed in the twelve 40-seat trailers which this company is building, to give more service to Camp Gordon and other lines.

Georgia
State
Capitol,
Atlanta, Ga.



This Sanitary Slat Seat

has the exclusive Hale and Kilburn Walkover mechanism, the exclusive Hale and Kilburn one-piece dustless pressed steel pedestals, the exclusive Hale and Kilburn corner grab handles—the original and safest grab handle for car seats. The handsome and comfortable outlines of this seat, as well as the vertical slatting for ventilation, will appeal to you and your public.

Made in polished ash, birch, cherry, mahogany, maple and oak. The Walkover Slat Seat is the favorite for the modern city car. Be sure to specify it.



Hale and Kilburn Corp.

Philadelphia
Washington

New York
Atlanta
Chicago

San Francisco
Louisville



THE OHMER SYSTEM



Under the Ohmer System, it is decidedly to the conductor's advantage to *collect* the fare, to collect the *right fare*, and to *register* the fare *correctly*. If for any reason the fare is not registered, the conductor is constrained to turn it in anyway, and you have *knowledge of the fact that it was not registered*.

The publicity which surrounds each transaction is such that irregularities on the part of both passenger and conductor are reduced to a minimum. If there *are* any irregularities, they are soon understood through the method of merit analysis made possible by the Ohmer System and the proper discipline can be applied.

The Ohmer System consists of the most successful ideas of modern business applied to the conservation of the receipts of electric railways.

OHMER FARE REGISTER COMPANY
DAYTON, OHIO

BOYERIZED PINS AND BUSHINGS

are appreciated for safety's sake

IF a brake pin went wrong on one of those 8 per cent. grades in Richmond there would be some doings.

But the Richmond railway folks don't take that kind of a chance.

They use Boyerized Pins and Bushings because they want both minimum upkeep and maximum safety.

Remember:

When you buy Boyerized products, you buy case-hardening that is uniform—a quality almost impossible in the ordinary blacksmith shop.



ELECTRIC RAILWAY SUPPLIES
Bemis Car Truck Company
SPRINGFIELD MASS

Nevasplit Headlinings



Specified for the 30 new cars of the International Railway

Another link in the long chain of NEVASPLIT cars.

Just glance at the illustration and note the smooth, neat surface of the headlining. NEVASPLIT is a wood fibre of the highest quality and therefore its uniform, even surface takes paint readily with most pleasing results.

NEVASPLIT will not shrink or warp, "check"

or split. It is waterproof and of minimum conductivity. And it will add safety and beauty to your car interiors, either as headlining insulation roofs or as interlining.

If you are unfamiliar with *all* the many qualities of NEVASPLIT, how it positively insures a saving in money, we will gladly send samples and descriptive bulletins.

Write for full particulars.

The Keyes Products Company
120 Broadway, New York

NEW YORK
W. R. Kerschner Co., Inc.
50 Church St.

SAN FRANCISCO
Ford & Geirrine
Merchants' Exchange Bldg.

It's a Revolution in Current Collectors



THE NEW MILLER TROLLEY SHOE is the ideal Current Collector. It eliminates arcing and noise. It reduces de-wirement to a minimum. It needs no lubricants. It delivers more power to the motors. It gives greater mileage. It reduces maintenance cost. It is standard on many roads.

Miller Trolley Shoe Co., West Newton, Mass.



H-B Life Guards

A Snappy Device in a Snappy Town

Roanoke, Va., is a little off of the beaten track; but it's well worth visiting for inspiration.

Clean streets, fine traffic regulation and highest grade electric railway service.

Take the car in the picture as an example. It has pretty nearly everything a good car should have, including the

H-B LIFE GUARD

The standard life-fending device of America. It's not only on Roanoke cars of this type, but on all of them.

The Consolidated Car Fender Co.

Providence, R. I.

General Sales Agent

Wendell & MacDuffie Co.

61 Broadway, New York



The Wonderful Single-Service Chilled-Iron Wheel

Standard for 67 Years

The Chilled Iron Wheel has performed its every function at a minimum cost.

For Freight Cars

95% of all cars in this type of service are carried on Chilled Iron Wheels.

For Street Cars

The Chilled Iron Wheel is Standard for Street Car Service in 95 out of 100 cities in the United States and Canada, operating 100 cars or over.

The Conclusion

to be gained from these figures is that the Chilled Iron Wheel gives the Greatest Service for the Lowest Cost.

Association of Manufacturers of Chilled Car Wheels
1229 McCormick Building, Chicago, Ill.

Representing Forty-eight Wheel Foundries Throughout the United States and Canada. Capacity 20,000 Chilled Iron Wheels per Day.





TRADE MARK
REG. U. S. PATENT OFFICE.

The Standard for Rubber Insulation

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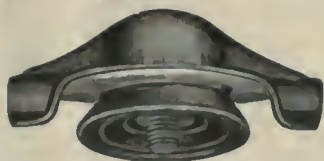
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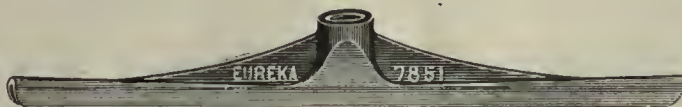




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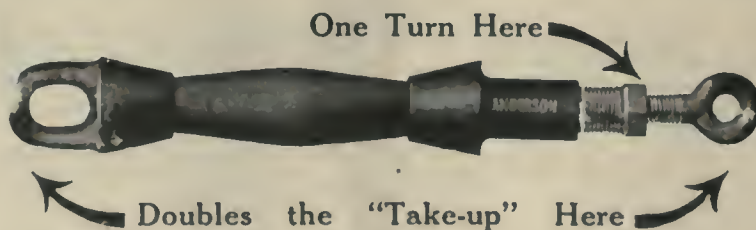
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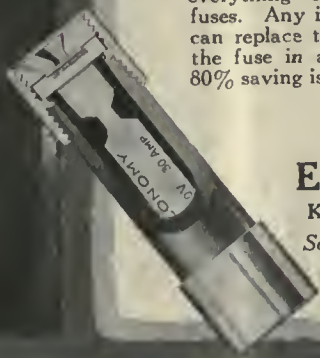
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Labor-Saving

Efficient

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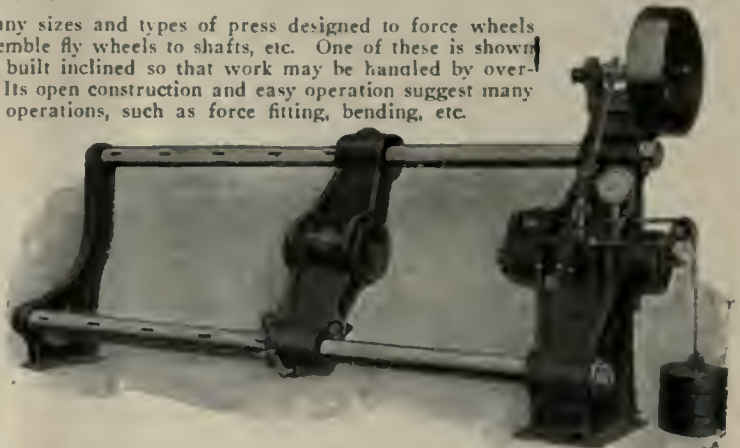
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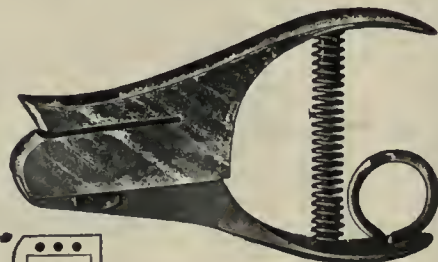
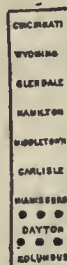


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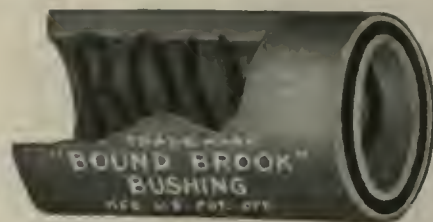


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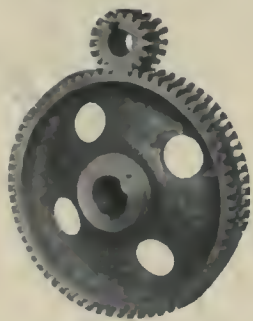
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It protects the
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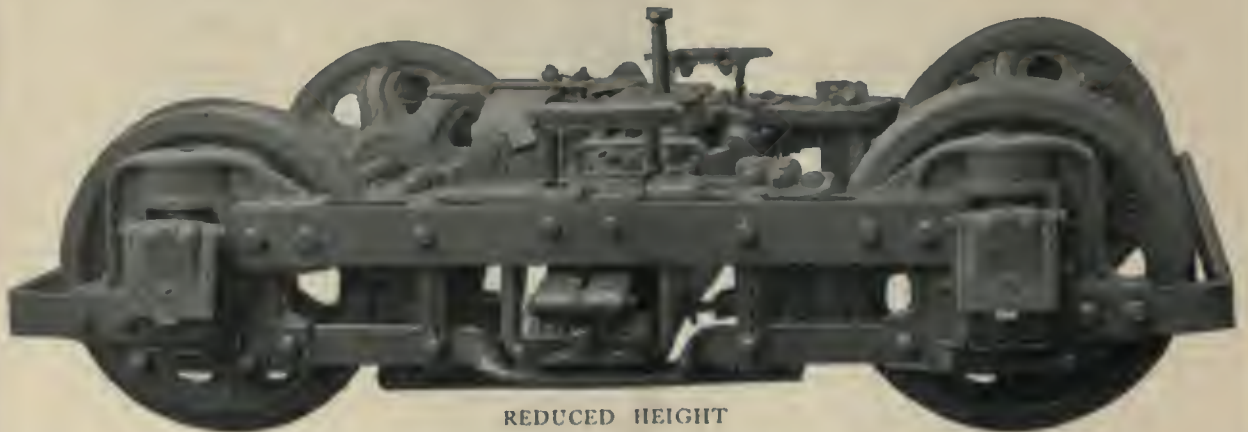
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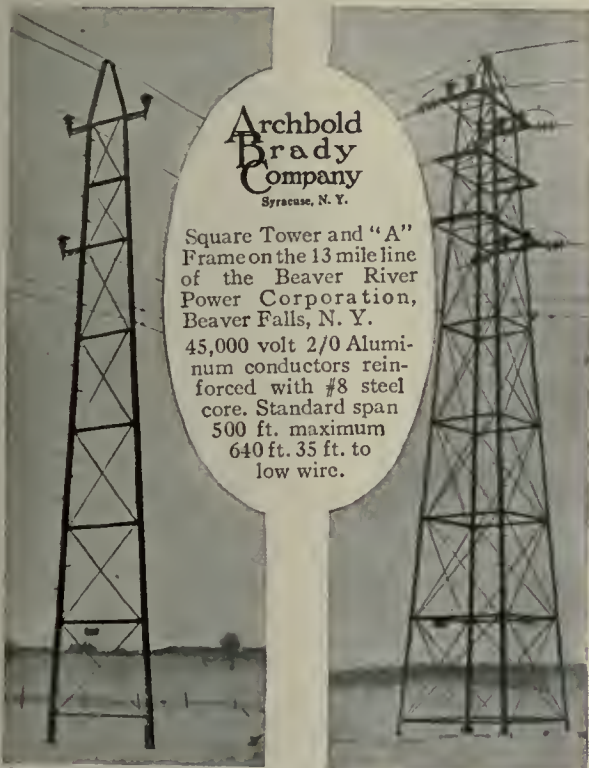
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Construction approved by City Engineers.

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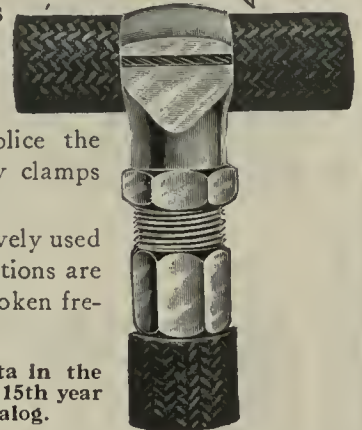
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Very extensively used where connections are made and broken frequently.

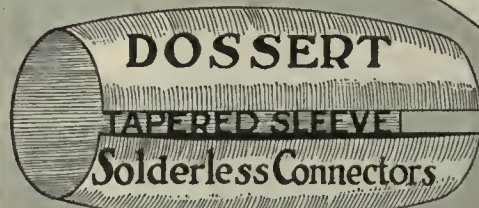
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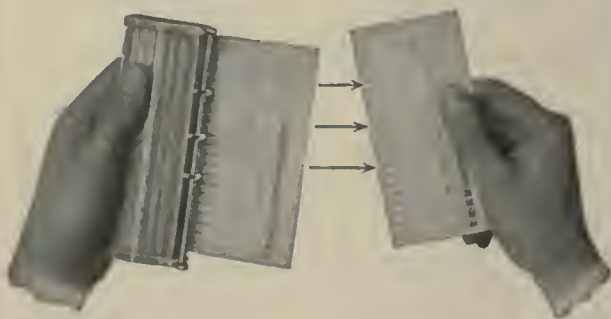
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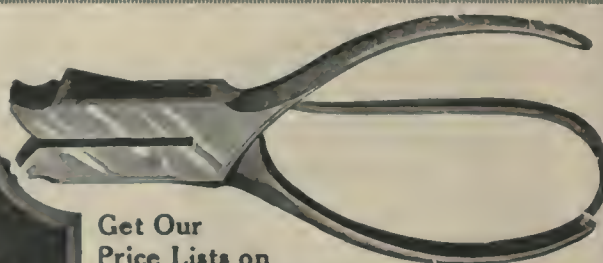
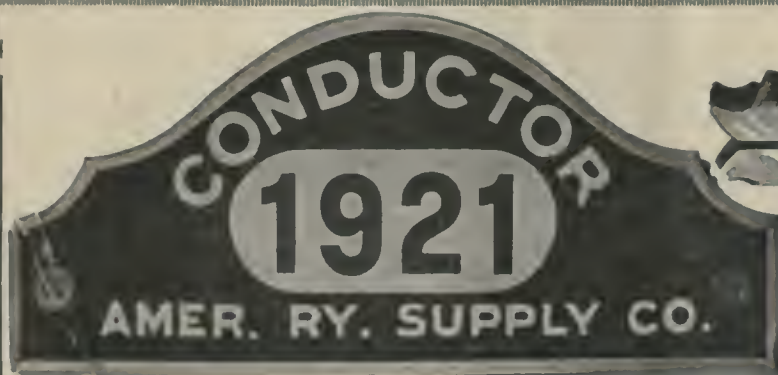
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The McLain No. 25 Headlight



gives powerful road illumination, at the same time eliminating glare. It is an extended dash type light made of Pressed Steel throughout, assuring light weight without any sacrifice in strength or durability. It is absolutely waterproof, weather proof and solid.

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have always been made of entirely new metal, which accounts for their long life **WITHOUT INJURY TO THE WIRE**. Do not be misled by statements of large mileage, because a wheel that will run too long will damage the wire. If our catalogue does not show the style you need, write us—the **LARGEST EXCLUSIVE TROLLEY WHEEL MAKERS IN THE WORLD**.



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Let us demonstrate to you how we can heat and ventilate your cars at the lowest possible cost.

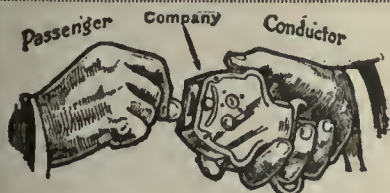
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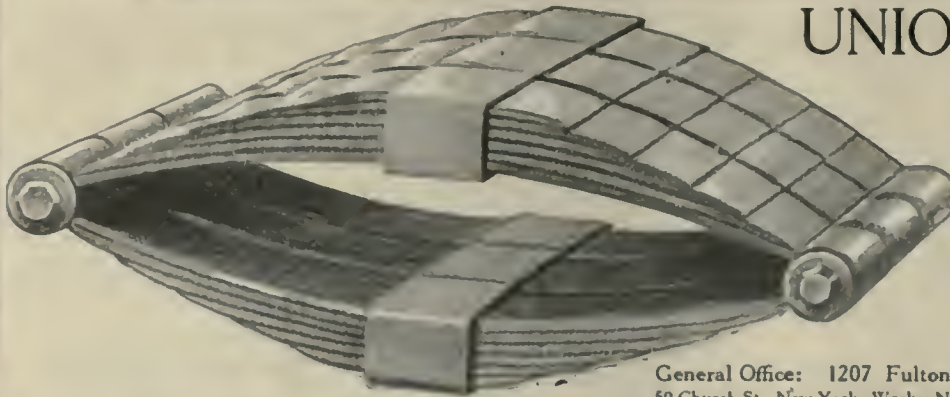
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accomplish the elimination of unnecessary dead weight, because they assure an ease of motion and absence from shocks even in light-weight cars at high speeds.

A car with correctly designed springs not only costs less in itself but saves wear and tear on track.

Consult us regarding the installation of money-saving springs in your new and to-be-rebuilt cars.

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Railroad and Tram Car Specialties

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Samson Spot Waterproof Trolley Cord

Made of fine cotton yarn braided hard and smooth. Inspected and guaranteed free from flaws. Proved to be the most durable and economical. Samples and information gladly sent.

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are made for every condition and requirement. M. C. B. Pin and Link, Car and Air, in all sizes and types.

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Use them in your terminals—
PEREY TURNSTILES
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Faster than the ticket seller

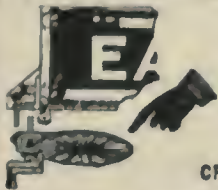
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See the Crank of the

CREAGHEAD DESTINATION SIGN

By means of it, conductor or motorman can change sign without leaving platform. All that has to be done is to turn the crank. Better investigate.

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The "Nycap-Exide" Battery

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STORAGE BATTERY STREET CARS

THE ELECTRIC STORAGE BATTERY CO
PHILADELPHIA

MASON SAFETY TREAD—lead or carborundum filled; non-slippery; prevents accidents; cuts out damage suits.

KARROLITH CAR FLOORING—for steel cars; is sanitary, light weight, fire proof, non-slippery.

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Our products used on all leading railroads, on cars and stations. For details address:

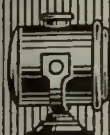
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Branch Offices: Boston, New York City, Philadelphia.
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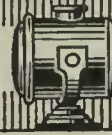
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Colored lights are notification to those following of the movement of the car's controller. Helps avoid rear-end accidents; avoids delays of cars behind. Used on leading railways.

THE NICHOLS-LINTERN CO.
Cleveland, Ohio, U. S. A.



SEARCHLIGHT SECTION



RECEIVER'S SALE

of Rockland, South
Thomaston and
St. George Railway

STATE OF MAINE
Knox, ss. Supreme Judicial Court
In Equity
Security Trust Company
vs.
Rockland, South Thomaston & St. George
Railway
and
Waldo Trust Company

Under and by virtue of decree in the above-entitled cause made on the twenty-first day of June, 1918, and filed in the office of the Clerk of Courts, Knox County, Maine, the undersigned Receiver, being thereunto duly authorized and directed, will receive bids in accordance with the terms and conditions of said decree, bids to be received by the Receiver at his office, 414 Main Street, Rockland, Maine, not later than twelve o'clock noon.

July 23, 1918

for the following property: All and singular, the real estate, buildings, road-bed, privileges, tracks, poles, lines, wires, material, machinery, equipment, tools, implements, supplies, property rights, easements, appurtenances and franchises, and all contracts and choses in action belonging to said Railway.

The aforesaid premises, property and franchises will be sold without valuation or appraisal. The Receiver will receive sealed bids for the property as an entirety or for any part or parcel thereof, as scheduled, with the right to reject any or all bids; each bid to be accompanied by a certified check for ten per cent. (10%) of the amount of the bid. Property will be sold free from all liens and claims of every character and of every name and nature whatsoever. No bid will be received by said Receiver from any person who shall not accompany his bid with a certified check for ten per cent. (10%) of the amount of the bid as a pledge and as part payment on account in case his bid is accepted. Deposits so received from unsuccessful bidders will be returned; that received from a successful bidder retained to be applied to the purchase price or forfeited in case the bid shall not be made good or the purchaser shall fail to comply with any order of Court relating to the payment for said property when and after said sale shall be confirmed; if sale not confirmed, deposit returned to bidder. Sale to be made subject to confirmation by the Court. Court reserves the right to resell the property in case the purchaser shall fail to make payments as required on confirmation of sale. Condition of sale more fully set forth in said decree, and title to be given in accordance therewith. All the above sold, condition and completeness as is; as seen and inspected; and as now located. By said decree all claims to said property and liens thereon are transferred to the funds derived from said sale, and the rights of all parties making such claims are to be adjudicated in the receiver-ship proceedings and protected in the distribution of the funds. Brief schedule will be furnished by Receiver.

Dated at Rockland, Maine, June 21, 1918.

S. THAYER KIMBALL,
Receiver

60 Tons 7-in Girder Rails

P. S. Co. Section No. 238
HENRY LEVIS & CO.
Commercial Trust Bldg., Philadelphia, Pa.

FOR SALE

One New 500 Kw., 600 volt

Rotary Converter

with a three-panel switchboard, step-down transformer, 13,200 volts primary, 445 volts secondary, 60 cycles, 3 phase, and electrolytic lightning arrester.

Equipment complete. Immediate shipment.

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85 lb. A. S. C. E. Relayers

16,000 tons—with Angle Bars to match. Available immediate shipment and centrally located.

We positively own these Rails and offer same in carload lots and over.

25,000 tons—Relayers—sizes 25 lb. to 100 lb., in stock our Pittsburgh yards and vicinity.

Immediate shipment guaranteed and prices very attractive.

Carload and less than carload inquiries and orders solicited.

Rails cut to length for structural purposes. Frogs, Switches, Bolts, Nuts, Spikes and all Accessories.

L. B. FOSTER COMPANY
Park Building, Pittsburgh, Pa.

FOR SALE

GE-80 and GE-67 MOTORS

with or without gears and gear cases.

Write

J. S. MacKENZIE
Purchasing Agent

Winnipeg (Man.) Electric Railway
Winnipeg, Man.

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1 inch—\$3.00
4 inches—2.90 an inch

(The above rate applies to a 4-inch space in one issue, a 2-inch space in two issues, or a 1-inch space in four issues. The larger spaces following may be used in a similar way.)

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15 inches—2.70 an inch
27 inches—2.60 an inch
50 inches—2.55 an inch

Rates for larger spaces furnished on application.

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Bridges Wanted

One through truss 100 to 150 ft., One swing span 160 to 180 ft., One bascule 80 to 90 ft. All bridges to have 16 to 20 ft. deck with provision for a 6 ft. sidewalk and designed to carry a 15-ton road roller. T. U. Fairlie, Hydro-Electric Power Commission of Ontario, Toronto, Canada.

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ARMATURE winder and electrician, familiar with general maintenance and capable of rolling stock; small road; 12 cars; give experience and salary. Married man preferred. P-198, Elec. Ry. Journal, Chicago.

ENGINEER—Wanted an electrical engineer to check up our various power losses, study car operation, test bonding, and other engineering and economy work, by an Eastern Pennsylvania railway system operating 200 cars, urban and interurban. Permanent position with good future. In replying, state age, family, education, experience and salary required. Address J. S. Avery, Reading Transit & Light Co., No. 12 South Fifth St., Reading, Pa.

MASTER Mechanic and General foreman for maintenance shop of large interurban company in Central West operating high speed cars with Type M control. Attractive salary. P-197, Elec. Ry. Journal, Chicago.

WORKING car barn foreman for a small street railway system in Colorado wanted. Man must be familiar with armature winding and competent to do and direct all car barn work. Address P-196, Elec. Ry. Journal, Chicago.

WORKING foreman for armature room wanted. Must be capable of winding all different types of street railway armatures. None but strictly sober man need apply. Please state salary expected. P-194, Elec. Ry. Journal, Philadelphia.

POSITIONS WANTED

SUPERINTENDENT of Rolling Stock and Master Mechanic now employed in charge of 350 city and interurban cars, for satisfactory reasons seeks opportunity to make a change. Married. Thoroughly experienced and can maintain equipment at high standard. PW-189, Elec. Ry. Journal.

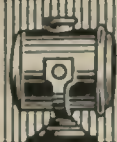
TRANSPORTATION—Can handle your transportation department and get results; 14 years with large street railway; thoroughly familiar with every detail of street railway transportation; best of reference from present employer; age 38. PW-181, Elec. Ry. Journal, Philadelphia.

AGENTS AND SALESMEN

Salesman Wanted

Young man with engineering training, to sell steam and street railway track work. State salary expected and all details in first letter. AS-188, Elec. Ry. Journal, Chicago.

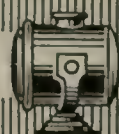
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into
the Searchlight



SEARCHLIGHT



SECTION



Railway Motors

- 10—Westinghouse No. 306 Railway Motors, Type "CA" Interpole, Box Type, suitable for axles up to 5 in.

Water Tube Boilers

- 4—512-hp. Babcock & Wilcox, 200-lb. pressure.
- 2—483-hp. Heine, 200-lb. pressure.
- 2—480-hp. Stirling, 160-lb. pressure.
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- 2—283-hp. Aultman & Taylor, 160-lb. pressure.
- 2—283-hp. Babcock & Wilcox, 160-lb. pressure.
- 3—243-hp. Heine, 160-lb. pressure.
- 2—240-hp. Stirling, 140-lb. pressure.
- 3—156-hp. Heine, 160-lb. pressure.

We shall be glad to mail complete list of electrical, steam and hydraulic machinery upon request.

MacGOVERN & COMPANY, Inc.
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FOR SALE

Complete Power Plant Immediate Delivery

Generating Units

- 1—GE 1000 K.W. D.C. Generator 575 volt direct connected to Allis-Chalmers 1500 H.P. cross compound engine.
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- Complete with switch boards, condensing apparatus, feed water pump, etc.

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- 5—Return tubular boilers.
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Will sell complete or any portion, subject to prior sale.

BUFFALO & LAKE ERIE TRACTION CO.
Erie, Pa.

Direct Current Belted Generator

- 1—500-kw., 550-V., 320 r.p.m.
Cp. Wd. Westinghouse 3 bearing direct current generator.

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Electric & Mfg Co. Inc.

Write, wire or 'phone our nearest office,
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- 125 hp. return tubular fire tube boiler. Charles River Iron Works, Edward Kendall Sons, Cambridgeport, Mass. Age 25 years.
- 125 hp. return tubular fire tube boiler. A. D. Ward, Augusta, Maine. Age 25 years.
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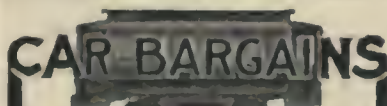
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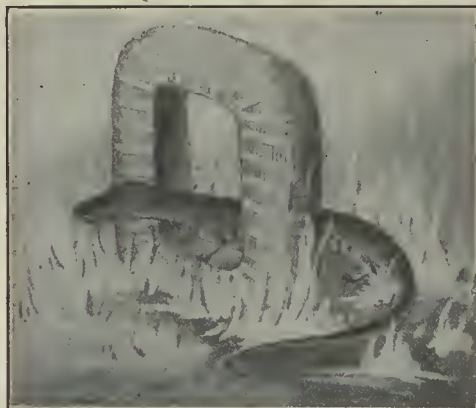
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More-Jones Brass & M. Co.
Hensley Trolley & Mfg. Co.
Nuttall Co., R. D.
Star Brass Works.
Western Electric Co.

Headlights.
Crouse-Hinds Co.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
St. Louis Car Co.
Trolley Supply Co.

Headlining.
Keyes Products Co.

Heaters, Car, Electric.
Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
Smith Heater Co., Peter.

Heaters, Car, Hot Air and Water.
Cooper Heater Co.
Smith Heater Co., Peter.

Heaters, Car, Stove.
Electric Service Supplies Co.
Smith Heater Co., Peter.

Holds and Lifts.
Columbia M. W. & M. I. Co.
Duff Manufacturing Co.
Ford Chain Block & Mfg. Co.
Niles-Bement-Pond Co.
Yale & Towne Mfg. Co.

Hose Bridges.
Ohio Brass Co.

Hose, Pneumatic and Fire.
Johns-Manville Co., H. W.

Hydraulic Machinery.
Niles-Bement-Pond Co.
Watson-Stillman Co.

Inspection.
Elec'l Testing Laboratories.

Instruments, Measuring, Testing and Recording.
Economy Electric Devices Co.
General Electric Co.
Johns-Manville Co., H. W.

Westinghouse Elec. & M. Co.
Weston Elec'l Instrument Co.

Insulated Wire Cutters.
Rubber Ins. Metals Corp.

Insulating Cloths, Paper and Tape.
Anchor Webbing Co.
General Electric Co.
Hope Webbing Co.
Irvington Varnish & Ins. Co.
Johns-Manville Co., H. W.
Mica Insulator Co.
Mitchell-Rand Mfg. Co.
Okonite Co.
Standard Paint Co.
Standard Underground Cable Co.
Standard Woven Fabric Co.
United States Rubber Co.
Westinghouse Elec. & M. Co.

Insulation. (See also Paints.)
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Johns-Manville Co., H. W.
Mitchell-Rand Mfg. Co.
Okonite Co.
United States Rubber Co.
Westinghouse Elec. & M. Co.

Insulators. (See also Line Material.)
Anderson M. Co., A. & J. M.
Creshead Engrg. Co.
Drew Elec. & Mfg. Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
General Electric Co.
Johns-Manville Co., H. W.
Macallen Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

Insulator Pins.
Electric Service Supplies Co.
Hubbard & Co.

Insulators Post Type.
Philadelphia Electric Company
Supply Dept., The

Insurance, Fire.
Marsh & McLennan Co.

Inventions, Developed and Perfected.
Peters & Co., G. D.

Jacks. (See also Cranes, Hoists and Lifts.)
Brill Co., The J. G.
Buckeye Jack Mfg. Co.
Columbia M. W. & M. I. Co.
Duff Manufacturing Co.
National Ry. Appliance Co.
Templeton Kenly & Co., Ltd.
Watson-Stillman Co.

Joints, Rail.
Carnegie Steel Co.
Hall Joint Co.
Zeinlecker Supply Co., W. A.

Journal Boxes.
Bemis Car Truck Co.
Brill Co., The J. G.
Gurney Ball Bearing Co.
Railway Roller Bearing Co.
S K F Ball Bearing Co.

Junction Boxes.
Johns-Manville Co., H. W.
Standard Underground Cable Co.

Laboratories.
Elec'l Testing Laboratories.

Lamp Guards and Fixtures.
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Lamps, Arc and Incandescent.
Anderson M. Co., A. & J. M.
General Electric Co.
Westinghouse Elec. & M. Co.

Lamps, Signal and Marker.
Nichols-Lintern Co.
Ohio Brass Co.

Lathes, Car Wheel.
Niles-Bement-Pond Co.

Lights, Portable Cartridge.
Milburn Co., The Alex.

Lighting Regulators, Car.
Holden & White, Inc.

Lightning Protection.
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

Liner Material. (See also Brackets, Insulators, Wires, etc.)
Anderson M. Co., A. & J. M.
Archbold-Brady Co.

Columbia M. W. & M. I. Co.
Creshead Engrg. Co.
Dick, Kerr & Co.
Dowsett & Co.
Drew Elec. & Mfg. Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
Eureka Co.
General Electric Co.
Holden & White, Inc.
Hubbard & Co.
Johns-Manville Co., H. W.
Macallen Co.
More-Jones Brass & M. Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

Locks.
Yale & Towne Mfg. Co.

Locomotives, Electric.
Brill Co., The J. G.
General Electric Co.
McGuire-Cummings Mfg. Co.
Westinghouse Elec. & M. Co.

Lubricating Engineers.
Galena-Signal Oil Co.

Lubricants, Oil and Grease.
Borne, Scrymser Co.
Galena-Signal Oil Co.

Lumber. (See Poles, Ties, Posts etc.)

Machine Work.
Columbia M. W. & M. I. Co.
Holden & White, Inc.

Machine Tools.
Columbia M. W. & M. I. Co.
Niles-Bement-Pond Co.
Watson-Stillman Co.

Manganese Parts.
Bemis Car Truck Co.

Mats.
Johns-Manville Co., H. W.

Meters, Car, Watthour.
Economy Electric Devices Co.

Meters (See Instruments.)

Mica.
Macallen Co.
Mechanical Rubber Co.

Mirrors for Motormen.
Drew Elec. & Mfg. Co.

Motormen's Seats.
Electric Service Supplies Co.
Wood Co., C. N.

Motor Generator, Bonding and Welding.
Lincoln Bonding Co.

Motors and Generators Sets.
General Electric Co.

Motors, Electric.
British-Westinghouse Elec. & Mfg. Co.
Dick, Kerr & Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Motor Leads.
Dowsett & Co.

Nuts and Bolts.
Barbour-Stockwell Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Hubbard & Co.

Oils. (See Lubricants.)

Overhead Equipment. (See Line Material.)

Oxy-Acetylene. (See Cutting Apparatus, Oxy-Acetylene.)

Packing.
Johns-Manville Co., H. W.
Power Specialty Co.
United States Rubber Co.
Westinghouse Trac. Brake Co.

Packing Rings.
Johns-Manville Co., H. W.

Paints and Varnishes. (Insulating.)
Holden & White, Inc.
Irvington Varnish & Ins. Co.
Johns-Manville Co., H. W.
Mica Insulator Co.
Mitchell-Rand Mfg. Co.
Standard Paint Co.

Paints and Varnishes. (Preservative.)
Johns-Manville Co., H. W.
Standard Paint Co.

Paints and Varnishes for Woodwork.
National Railway Appliances Co.

Paving Bricks, Filler and Stratcher.
Nelsonville Brick Co.

Paving Material.
American B. S. & Fdry. Co.
Nelsonville Brick Co.



Its
"Place in the Sun"

has been gained by the Hensley Trolley Wheel through good workmanship, good materials, force-feed lubrication and all-around satisfactory service.

We want to prove it to you on your cars.

Ask us about our trial offer.

Hensley Trolley & Mfg. Co.
 Detroit, Michigan

**MORGANITE
 BRUSHES**

*-for good
 commutation*

THE MORGAN CRUCIBLE
 COMPANY

MAIN OFFICE and FACTORY:

519 West 38th Street, New York
 City. DISTRICT AGENTS: Lewis
 & Rolh, Philadelphia; Electrical
 Engineering & Mfg. Co., Pitts-
 burgh; W. L. Rose Equipment
 Co., St. Louis, Mo.; Herzog Elec-
 tric & Engineering Co., San Fran-
 cisco, Cal.; W. R. Hendrey Co.,
 Seattle, Wash.; Charles Farnham,
 Los Angeles, Cal.

*Are You
 Getting
 the "Dustoor" Hai "Hook"?*

**The Coal & Iron National Bank
 of the City of New York**

Capital, Surplus & Profits \$1,635,000
 Resources Nearly \$10,000,000

Offers to dealers every facility of a New York
 Clearing House Bank.



**AN "IMPERIAL"
 TIE TAMPING
 OUTFIT**

AT CEDAR RAPIDS, IOWA

The employment of "Imperial" Pneumatic Tampers has proven everywhere that it is a vital factor in overcoming the handicap of insufficient track labor.

Better work is accomplished with fewer men, costs are materially reduced and a season's work completed when without "Imperial" Tampers it could not have been done.

The tampers can also be used for cutting asphalt and breaking up concrete.

"Imperial" Tampers do not need special workmen, your present gang is entirely capable. The compressor takes power from the trolley line—a convenient and economical source of power.

Ask for Bulletin 9023.

INGERSOLL-RAND CO.

11 Broadway
 New York

165 Q. Victoria St.
 London

Offices the World Over

86-TT



WHAT AND WHERE TO BUY

- Pickups. (Trolley Wire.)**
Electric Service Supplies Co.
Ohio Brass Co.
- Pinion Pullers.**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
Wood Co., C. N.
- Pinions. (See Gears.)**
- Pins, Case Hardened, Wood and Iron.**
Bemis Car Truck Co.
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse Trac. Brake Co.
- Pipe.**
National Tube Co.
- Pipe Fittings.**
Power Specialty Co.
Standard Steel Works Co.
Watson-Stillman Co.
Westinghouse Trac. Brake Co.
- Pliers, Insulated.**
Electric Service Supplies Co.
National Railway Appliance Co.
Rubber Ins. Metals Corp.
- Pneumatic Hose.**
Westinghouse Trac. Brake Co.
- Poles, Metal Street.**
Electric Railway Equipment Co.
Hubbard & Co.
National Railway Appliance Co.
- Pole Sleeves.**
Drew Elec. & Mfg. Co.
- Poles, Ties, Posts, Piling and Lumber.**
Carney & Co., B. J.
Lindsay Bros. Co.
Page & Hill Co.
Valentine-Clark Co.
Western Red Cedar Assn.
White Marble Lime Co.
- Poles and Ties, Treated.**
Lindsay Bros.
Page & Hill Co.
Valentine-Clark Co.
- Poles, Trolley.**
Anderson M. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
National Tube Co.
Nuttall Co., R. D.
- Pole Reinforcing.**
Hubbard & Co.
- Poles, Tubular Steel.**
National Tube Co.
- Pathways.**
Okonite Co.
Philadelphia Electric Company Supply Dept., The
- Power Saving Devices.**
Arthur Power-Saving Recorder Co.
- Pressure Regulators.**
General Electric Co.
Ohio Brass Co.
Westinghouse Trac. Brake Co.
- Protective Devices.**
Philadelphia Electric Company Supply Dept., The
- Pumps.**
Watson-Stillman Co.
- Punches, Ticket.**
American Railway Supply Co.
Bonney-Vehslage Tool Co.
International Register Co., The
Wood Co., C. N.
Woodman Mfg. & Supply Co., R.
- Punching Machinery.**
Watson-Stillman Co.
- Purifiers, Feed Water.**
Seale & Sons Co., Wm. B.
- Rail (Incuders. (See Grinders.))**
- Rails, Relaying.**
Zelicker Supply Company, Inc., Walter A.
- Rail Welding. (See Welding Processes and Apparatus.)**
- Rattan.**
Brill Co., The J. G.
Electric Service Supplies Co.
Hale & Kilburn Corp.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.
- Recorders, Power Saving.**
Arthur Power-Saving Recorder Co.
- Registers and Fittings.**
Bonham Recorder Co.
Brill Co., The J. G.
Electric Service Supplies Co.
- International Register Co., The**
Unimor Fare Register Co.
Rooke Automatic Register Co.
- Reinforcing Concrete.**
American Steel & Wire Co.
- Relays, Reverse Phase.**
Philadelphia Electric Company Supply Dept., The
- Repair Shop Appliances. (See also Coll Banding and Winding Machines.)**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
- Repair Work. (See also Colls. Armature and Field.)**
Cleveland Armature Works.
Columbia M. W. & M. I. Co.
General Electric Co.
Independent Lamp & W. Co.
King-Coil Mfg. Co.
Westinghouse Elec. & M. Co.
- Replacers, Car.**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
- Resistance, Grid.**
Columbia M. W. & M. I. Co.
- Resistance, Wire and Tube.**
General Electric Co.
Westinghouse Elec. & M. Co.
- Retrievers, Trolley. (See Catchers and Retrievers, Trolley.)**
- Rheostats.**
General Electric Co.
Westinghouse Elec. & M. Co.
Mica Insulator Co.
- Roofing, Building.**
Johns-Manville Co., H. W.
Standard Paint Co.
- Roofing, Car.**
Johns-Manville Co., H. W.
Keyes Products Co.
- Rubber Specialties of all Kinds.**
United States Rubber Co.
- Sanders, Track.**
Brill Co., The J. G.
Cleveland Fare Box Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Holden & White, Inc.
Nichols-Lintern Co.
Ohio Brass Co.
St. Louis Car Co.
- Sash Fixtures, Car.**
Brill Co., The J. G.
- Sash, Metal, Car Windows.**
Hale & Kilburn Co.
- Sealing Material. (See also Rattan.)**
Brill Co., The J. G.
Du Pont Fabrikoid Co.
- Seats, Car.**
Brill Co., The J. G.
Hale & Kilburn Corp.
Peterson & Co., G. D.
St. Louis Car Co.
- Second-Hand Equipment. (See Searchlight Section.)**
Archer & Baldwin.
MacGovern & Co.
- Shades, Vestibule.**
Brill Co., The J. G.
- Shovels.**
Hubbard & Co.
- Signals, Car.**
Nichols-Lintern Co.
- Signals, Car Starting.**
Electric Service Supplies Co.
Consolidated Car Heating Co.
National Pneumatic Co.
- Signals, Highway Crossing.**
U. S. Electric Signal Co.
- Signal Systems, Block.**
Electric Service Supplies Co.
Federal Signal Co.
Union Switch & Signal Co.
U. S. Electric Signal Co.
Wood Co., C. N.
- Shack Adjuncts. (See Brakes Adjusters.)**
- Steel Wheels and Cutters.**
Anderson M. Co., A. & J. M.
Bonney-Vehslage Tool Co.
Columbia M. W. & M. I. Co.
- Drew Elec. & Mfg. Co.**
Holden & White, Inc.
More-Jones Brass & M. Co.
Nuttall Co., R. D.
- Snow-Plows, Removers, Sweepers, etc.**
Brill Co., The J. G.
Consolidated Car Fender Co.
Columbia M. W. & M. I. Co.
McGuire-Cummings Mfg. Co.
- Soldering and Brazing Apparatus. (See Welding Proc. & App.)**
- Solderless Connectors.**
Westinghouse Elec. & Mfg. Co.
- Speed Indicators.**
Johns-Manville Co., H. W.
Wood Co., C. N.
Woodman Mfg. & Supply Co., R.
- Spikes.**
American Steel & Wire Co.
- Splicing Compounds.**
Johns-Manville Co., H. W.
Standard Woven Fabric Co.
United States Rubber Co.
Westinghouse Elec. & M. Co.
- Splicing Sleeves. (See Clamps and Connectors.)**
- Springs, Car & Truck.**
American Steel Foundries
American Steel & Wire Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Standard Steel Works Co.
Taylor Elec. Truck Co.
Union Spring & Mfg. Co.
- Sprinklers, Track and Road.**
Brill Co., The J. G.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.
- Steps, Car.**
American Mason S. T. Co.
Universal Safety Tread Co.
- Stokers, Mechanical.**
Babcock & Wilcox Co.
Green Engrg. Co.
Westinghouse Elec. & M. Co.
- Storage Batteries. (See Batteries, Storage.)**
- Strand.**
Roebbling's Sons Co., J. A.
- Straps, Car, Sanitary.**
Holden & White, Inc.
Railway Improvement Co.
- Structural Iron. (See also Bridges.)**
- Superheaters.**
Babcock & Wilcox.
Power Specialty Co.
- Sweepers, Snow. (See Snow-Plows, Sweepers and Brooms.)**
- Switchstands.**
Kilby Frog & Switch Co.
Ramapo Iron Works.
- Switches, Disconnecting.**
Philadelphia Electric Company Supply Dept., The
- Switches, Lock.**
Weiss Switch Lock Co.
- Switches, Safety.**
V. V. Fittings Co.
- Switches, Track. (See Track, Special Work.)**
- Switches and Switchboards.**
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.
- Tampers, Tie.**
Ingersoll-Hand Co.
- Tapes & Cloth. (See Insulating Cloth, Paper and Tape.)**
- Telephones and Parts.**
Electric Service Supplies Co.
- Terminals.**
Frankel Connector Co.
- Terminal Cables.**
Standard Underground Cable Co.
- Testing, Commercial and Electrical.**
Electrical Testing Laboratories.
- Testing Instruments. (See Instruments, Electrical, Measuring, Testing.)**
- Thermostats.**
Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
Railway Utility Co.
Smith Heater Co., Peter.
- Ticket Boxes.**
Macdonald Ticket & Ticket Box Co.
- Ticket Choppers and Destroyers.**
Electric Service Supplies Co.
- Tickets and Transfers.**
American Railway Supply Co.
- Ties, Mechanical.**
Dayton Mechanical Tie Co.
- Ties and Tie Rods, Steel.**
Barbour-Stockwell Co.
Carnegie Steel Co.
International Steel Tie Co.
- Ties, Wood. (See Poles, Ties, etc.)**
- Tools, Track and Miscellaneous.**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Johns-Manville Co., H. W.
Railway Track-work Co.
- Toggles, Acetylene. (See Cutting Apparatus, Oxy-Acetylene.)**
- Towers and Transmission Structures.**
Archbold-Brady Co.
Westinghouse Elec. & M. Co.
- Track, Special Work.**
Barbour-Stockwell Co.
Cleveland Frog & Crossing Co.
Columbia M. W. & M. I. Co.
Kilby Frog & Switch Co.
New York Switch & Crossing Co.
Ramapo Iron Works.
- Transfers. (See Tickets.)**
- Transfee Issuing Machines.**
Unimor Fare Register Co.
- Transfer Tables.**
Archbold-Brady Co.
- Transformers.**
General Electric Co.
Westinghouse Elec. & M. Co.
- Treads, Safety Stair Car Step.**
American Mason Safety Tread Co.
Universal Safety Tread Co.
- Trolley Bases.**
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Holden & White, Inc.
More-Jones Brass & M. Co.
National Railway Appliance Co.
Nuttall Co., R. D.
Ohio Brass Co.
Trolley Supply Co.
- Trolley Bases, Retrieving.**
Holden & White, Inc.
- Trolley Shoes.**
Holden & White, Inc.
Miller Trolley Shoe Co.
- Trolley Wire.**
Roebbling's Sons Co., J. A.
- Trolleys and Trolley Systems.**
Ford Chain Block & Mfg. Co.
- Trucks, Car.**
American Steel Foundries
Bemis Car Truck Co.
Brill Co., The J. G.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.
Taylor Elec. Truck Co.
- Tubing, Steel.**
National Tube Co.
- Turbines, Steam.**
General Electric Co.
Westinghouse Elec. & M. Co.
- Turnstiles.**
Perry Mfg. Co., Inc.
- Valves.**
Ohio Brass Co.
Westinghouse Elec. & M. Co.
- Varnishes. (See Paints, etc.)**
- Ventilators, Car.**
Brill Co., The J. G.
Holden & White, Inc.
National Railway Appliance Co.
Nichols-Lintern Co.
Railway Utility Co.
St. Louis Car Co.

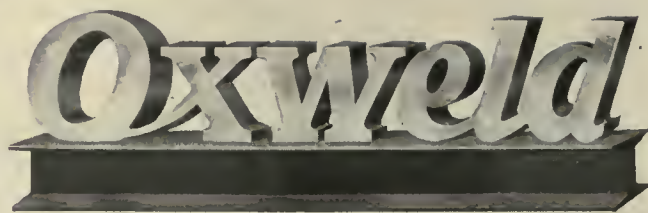


Le Carbone
Carbon Brushes are
uniform. They talk
for themselves

W. J. Jeandron
173 Fulton Street
New York City

Pittsburgh Office:
636 Wabash Building

Canadian Distributors:
Lyman Tube & Supply Co., Ltd.
Montreal and Toronto



Where Pennies Save Dollars

IN EVERY DEPARTMENT of electric railway construction and upkeep—wherever metal is to be cut or joined—wherever repairs are needed—Oxweld equipment yields profitable service. Oxweld apparatus for welding and cutting with the oxy-acetylene flame means a short cut to the best work at the lowest cost.

The Oxweld Injector Type Blowpipe works with constant efficiency on all pressures down to $\frac{1}{2}$ lb. per square inch, and utilizes a far greater proportion of the gas content of a cylinder than does the ordinary blowpipe.

Oxweld Acetylene Generators are preferred where economical supply of gas, dependability, and durability are considered.

Write for Bulletin Series 700

Oxweld Acetylene Company

NEWARK, N. J. CHICAGO LOS ANGELES

*World's Largest Maker of Oxy-Acetylene
Equipment for Welding and Cutting Metals*

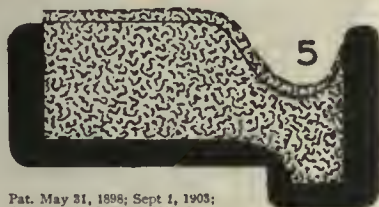
Wheel Condition No. 5

Especially for Removing Flat Spots

When the tread and flange both need grinding you can do it without removing the car from service by using this type of wheel Truing Brake Shoe.

There are 500 different styles of patterns.

Write for the list of roads using them.



Pat. May 31, 1898; Sept 1, 1903;
Aug. 2, 1904; Dec. 29, 1906; June
15, 1909; April 21, 1914.

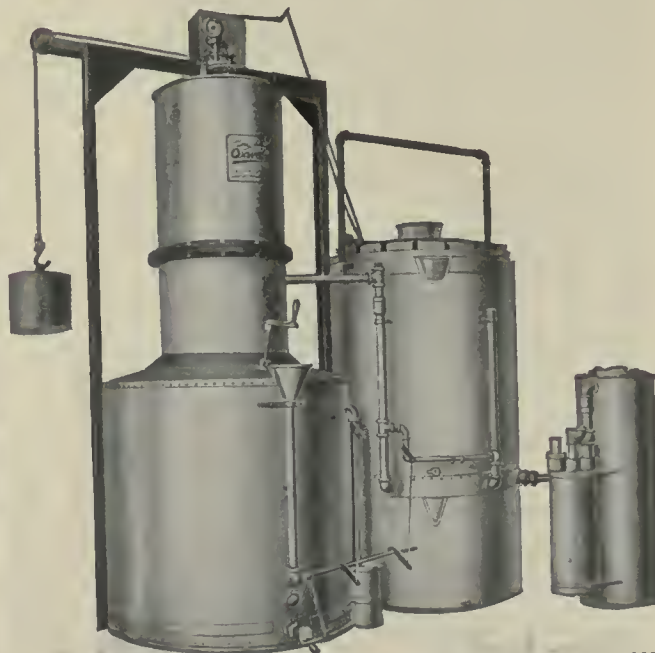
Wheel Truing Brake Shoe Co.
DETROIT, MICHIGAN

The Art of Buying

is as much a reality as is the Art of Selling. Advertising of the right kind helps the *buyer* as much as it does the seller.

The Electric Railway Journal Advertising Service Department helps advertisers prepare advertising copy of real interest and use to Journal readers.

The Advertising Service Department is ready to serve you, Mr. Manufacturer.



Oxweld Low Pressure Acetylene Generator

Collier Service

at Jacksonville

CHANGING CARDS
There are two classes of advertisers in the cars—National (or general) and Local. A National advertiser is one who advertises all over the country, such as National Biscuit Company, Wrigley's Spearmint or Coca Cola. A Local advertiser is usually a local business man who advertises only in the town where he has his place of business, or who may possibly use the cars in a few neighboring towns.

Clear down the Atlantic Coast from Jersey City to Jacksonville, every electric car carries Collier Service Cards.

And this is but a small fraction of Collier Service Installations since Collier Car Cards will be found from Canada to Mexico; from the Atlantic to the Pacific.

For this reason, the local advertiser in Jacksonville and many other cities can get as good a design for his business as the great national advertisers who use 50,000 cards or more.

Such selling help, which goes a long way toward giving car-card advertising good repute and rental value, is possible only through the division of manufacturing cost in the nation-wide organization of Collier Service.

Barron G. Collier
INCORPORATED

Candler Building

220 West 42nd Street, New York City



Columbia Brake Levers

No. 4 *Rounding the ends*

THE ends having been squared off close to the chalk line made 'round the template, the brake lever is brought to another press where the ends are sheared to the desired arc. Now the brake lever is ready for drilling.

*Speaking of cars—and car maintenance, too
how about these standard articles and tools?*

Columbia Machine Works & Malleable Iron Co.

Atlantic Ave. and Chestnut St.
Brooklyn, N. Y.

TOOLS

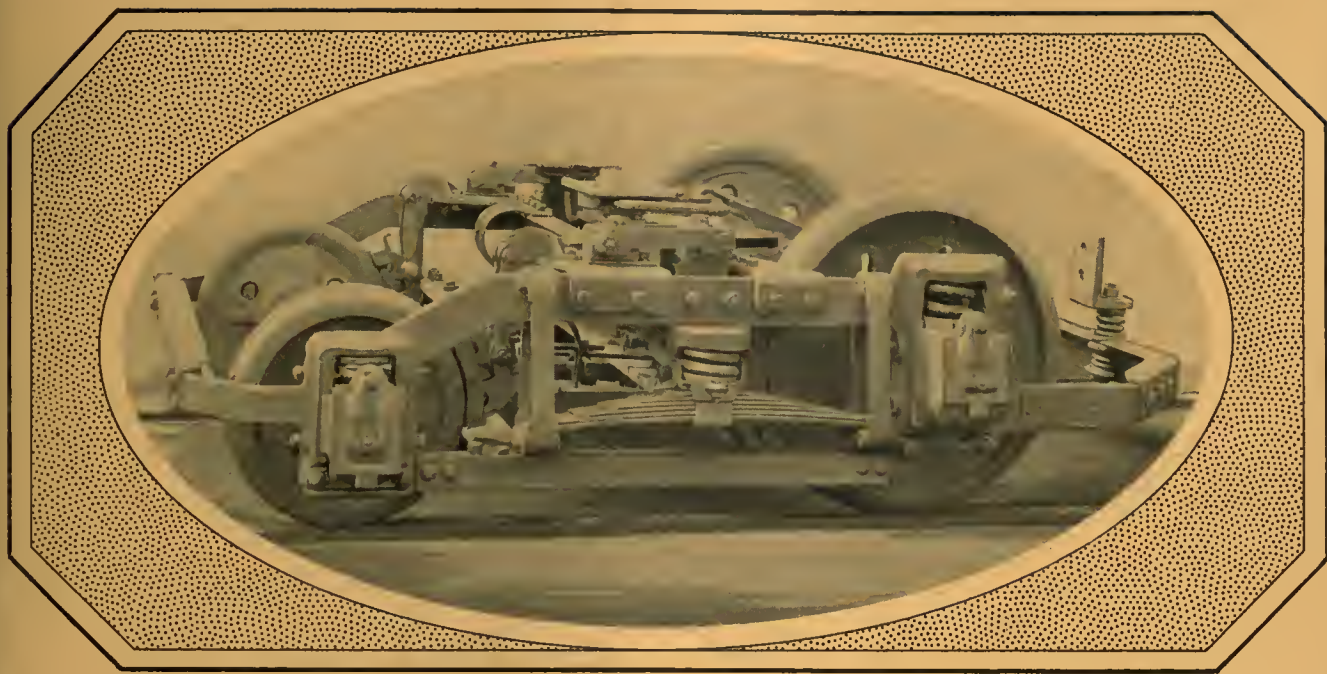
Armature and Axle Straighteners
Armature shaft straighteners
Armature buggies and stands
Babbitt molds
Banding and heading machines
Car hoists
Car replacers
Coil taping machines for armature leads
Coil winding machines
Pinion pullers
Pit jacks
Signal or target switches
Tension stands

W. R. Kerachner Co., Inc., N. Y.
Holden & White, Inc., Chicago
F. F. Bodler, San Francisco
Railway & Power Eng. Co., Ltd.,
Toronto, Ont.



CAR EQUIPMENT

Armature and Axle Bearings
Armature and field coils
Bearings (Axle and Armature)
Brush-holders and brush-holder springs
Brake, door and other handles
Brake forgings, riggings, etc.
Car trimmings
Commutators
Controller handles
Forgings of all kinds
Gear cases (steel or malleable iron)
Grid resistors
Third-rail shoe beams and accessories
Trolley poles (steel) and wheels



Giving the Springs Fair Play

Since the Bolster Guide has been made a regular part of Brill trucks there is no binding or checking of the bolster motion under motor or brake pressure and consequently the springs act just as freely during starting and stopping as at any other time. Then the Graduated Spring System gives the car the proper cushioning effect for the load it happens to be carrying, instead of jolting it along most of the time on maximum-load springs that are only needed for rush-hour service and then only in one direction. Together these two features make the springs one hundred per cent. efficient and add immensely to the comfort of passengers and the life of equipment. Bulletin 227 tells how they apply to the 39-E Single-Motor Truck.

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.

G. C. KUHLMAN CAR CO.
CLEVELAND, OHIO

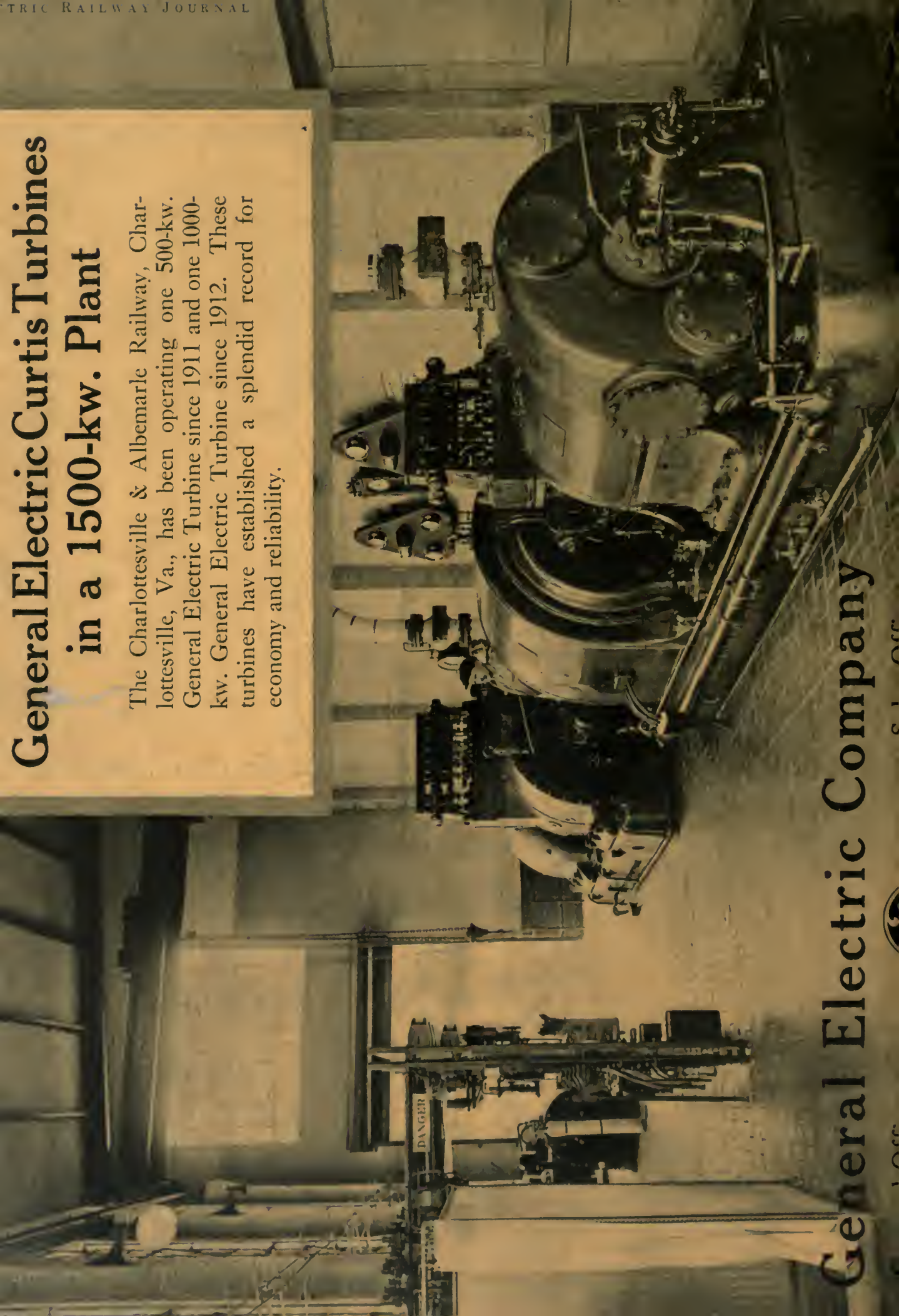


AMERICAN CAR COMPANY
ST. LOUIS, MO.

WASON MANUFACTURING CO.
SPRINGFIELD, MASS.

General Electric Curtis Turbines in a 1500-kw. Plant

The Charlottesville & Albemarle Railway, Charlottesville, Va., has been operating one 500-kw. General Electric Turbine since 1911 and one 1000-kw. General Electric Turbine since 1912. These turbines have established a splendid record for economy and reliability.



General Electric Company

ELECTRIC RAILWAY JOURNAL

July 13, 1918



This bar

Prevents
Glass Breakage

Deflection of the supporting bar is the chief cause of glass breakage in skylights.

Aspromet Glazing Construction

Formerly Waugh Glazing

carries practical assurance against glass breakage because the Aspromet Bar *cannot* deflect. Its rolled steel beam is designed to safely carry the total live and dead loads.

To make Aspromet Glazing *permanent* and *eliminate upkeep* cost, APM rust-proof protection is applied to this supporting bar

as well as all other metal parts. They *do not even require painting*, for APM protects them completely from the weather, corrosive vapors and chemical fumes that would quickly destroy unprotected steel.

Bulletin 58G describes Aspromet Glazing and its application to public service and industrial plants. Write for a copy.

Aspromet  Company
Pittsburgh (FIRST NATIONAL BANK BUILDING) U.S.A.

Formerly Asbestos Protected Metal Co.



Digging In

"AT the board meeting yesterday, Joe," said the General Manager to the Superintendent, "the cost of putting our equipment in first-class shape, before the winter season sets in, was fully discussed. All agreed that we should start now, and be ready for the winter 'drive.' "

"On account of the long deliveries, you should place orders right away, for all repair and spare parts that our experience has shown we ought to have on hand."

"Here's a list I have already prepared" answered Joe, "of what we will surely need. It is interesting to note, that practically all of this material is for that bunch of old-type motors."

The General Manager, looking over the list, replies, "Joe, we will not order that big lot of material, we will order new Westinghouse No. 532 motors right away, to replace half of the old type, and with those old spare motors on hand, we can keep the other half going during the winter."

"That's fine" answered Joe, "it will put us in A-I shape."

Westinghouse Electric

*Sales Offices in
All Large American Cities*



& Manufacturing Co.

**East Pittsburgh,
PENNSYLVANIA**

Electric Railway Journal

H. W. BLAKE, Editor

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Spies and Lies

German agents are everywhere, eager to gather scraps of news about our men, our ships, our munitions. It is still possible to get such information through to Germany, where thousands of these fragments—often individually harmless—are patiently pieced together into a whole which spells death to American soldiers and danger to American homes.

But while the enemy is most industrious in trying to collect information, and his systems elaborate, he is *not* superhuman—indeed he is often very stupid, and would fail to get what he wants were it not deliberately handed to him by the carelessness of loyal Americans.

Do not discuss in public, or with strangers, any news of troop and transport movements, of bits of gossip as to our military preparations, which come into your possession.

Do not permit your friends in service to tell you—or write you—"inside" facts about where they are, what they are doing and seeing.

Do not become a tool of the Hun by passing on the malicious, disheartening rumors which he so eagerly sows. Remember he asks no better service than to have you spread his lies of disasters to our soldiers and sailors, gross scandals in the Red Cross, cruelties, neglect and wholesale executions in our camps, drunkenness and vice in the Expeditionary Force, and other tales certain to disturb American patriots and to bring anxiety and grief to American parents.

And do not wait until you catch someone putting a bomb under a factory. Report the man who spreads pessimistic stories, divulges—or seeks—confidential military information, cries for peace, or belittles our efforts to win the war.

Send the names of such persons, even if they are in uniform, to the Department of Justice, Washington. Give all the details you can, with names of witnesses if possible—show the Hun that we can beat him at his own game of collecting scattered information and putting it to work. The fact that you made the report will not become public.

You are in contact with the enemy *today*, just as truly as if you faced him across No Man's Land. In your hands are two powerful weapons with which to meet him—discretion and vigilance. *Use them.*

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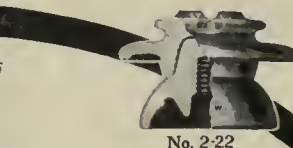
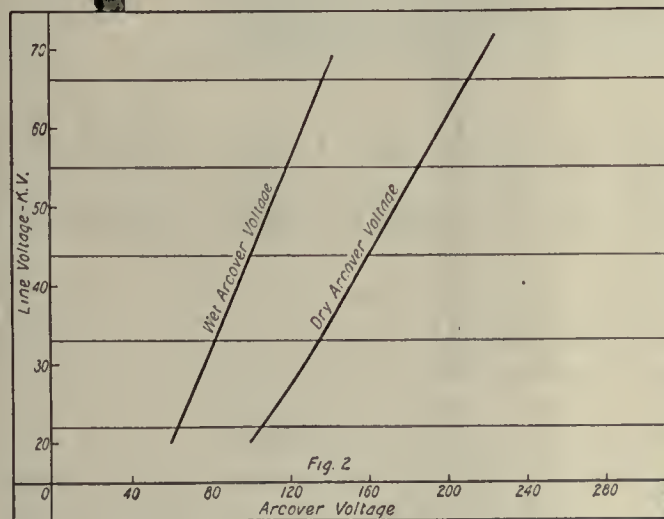
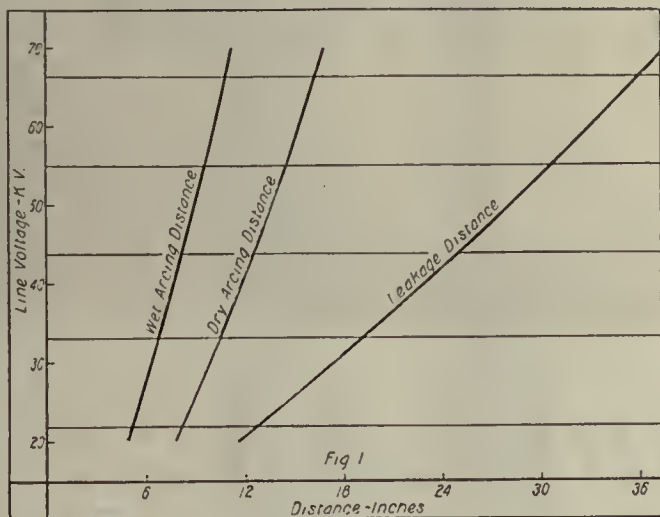
Westinghouse Air Brake Company, Pittsburgh, Pa.

Trade—Faradoid—Mark

High-Efficiency, Pin Type

"Patented"

Porcelain Insulators



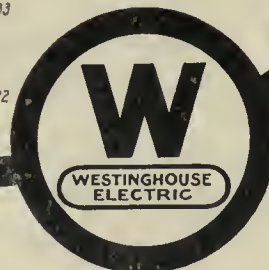
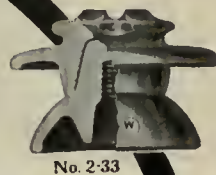
This line of insulators was developed by the Westinghouse Electric Company to reduce operating hazards.

The curves show the uniformity of the arc-over voltages, and of the physical dimensions.

Our engineers will co-operate with you, and endeavor to assist further, in solving your insulator troubles. Send for catalogue No. 6-A.

Westinghouse Electric & Manufacturing Co.
East Pittsburgh, Pa.

Sales Offices in All Large American Cities



Westinghouse

Phono-Electric



Not a tension pull—Not a break in TEN YEARS' service on The Denver & Interurban Railroad

Whatever other commendable qualities Phono-Electric Trolley Wire may have, the quality of reliability justly dominates in the mind of the electric railway operator.

That's why we feel we can add nothing to this report from the 11,000-volt single-phase Denver & Interurban Railroad:

"In regard to the Phono-Electric Wire used, it may be interesting to know that on 47 miles of catenary construction it has never been necessary to make any additional tension pulls

in trolley since original installation; also there has never been a break of the trolley wire in this line and not a foot of new wire installed except at a point where wire was kinked, caused by sleeve giving up. Pantographs in use on this service are of $\frac{1}{8}$ in. mild steel, 4 in. in width, are maintained at a pressure of 12 to 18 lbs. at the wire and giving the life of 25,000 to 35,000 miles."

Bridgeport Brass Company
Bridgeport **Connecticut**



PRODUCTS

Quality First



O-B Extruded Trolley Ears

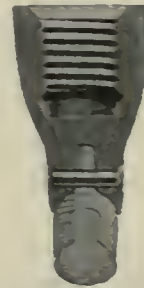
Runner piece is of extruded metal. Malleable iron base is secured to it by five heavy rivets



On Grooved Wire
Perfect Wheel
Clearance



On Round Wire
Generous
Amount of
Metal in Lips



On Figure 8
Wire Perfect
Wheel Clearance

O-B EXTRUDED EARS

Long Life

Toughness, denseness and ductility are squeezed into extruded metal during manufacture. Consequently O-B Extruded Ears resist wear stubbornly.

They have established exceptional records for long life.

Accurate Fit

Another logical result of the extrusion process—which consists of forcing red-hot (not molten) brass through a die under tremendous pressure—is precise fit on the wire. Surfaces are smooth and dimensions accurate, so the ear grips the trolley evenly and tightly.

These features—long life and accuracy—occur in like degree in every O-B Extruded Ear. For they are all made in exactly the same way.

Uniformity

There is one and only one sure way to find out what Extruded Ears will do and save on your property. Put them out on the same line with other ears and watch the results.

O-B Engineers will be glad to coöperate with you in any overhead problems. They can draw upon a fund of experience gathered on representative roads in all parts of the country.

The Ohio Brass Company, Mansfield, Ohio

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Portable Welder

FOR RAIL BONDING OR ARC WELDING

It has no rotating parts, therefore no commutators or bearings.

The Welder Portion shown in the photograph weighs but 65 pounds complete with mounting. It is easily handled by one man. No flames or arc strikes either the rail or the bond.

Small investment. Prompt delivery.

The Electric Railway Improvement Co.
Cleveland



ERICO
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Wooden Ties	[Per 100 Feet of Track]	Int. Steel Ties
20 tie rods.....	\$17.00	16½ steel twin ties.....\$116.66
50 ties	42.50	134 cast malleable clips..... 10.72
100 tie plates	45.00	15 cu.yd. concrete..... 87.75
100 lb. spikes	4.00	15.2 cu.yd excavation..... 19.00
28.3 cu.yd. concrete.....	165.56	
34 cu.yd. excavation.....	42.50	
<hr/>		
Total.....	\$316.56	Total.....\$243.13

Saved per 100 feet \$82.43
Saved per Mile of track.. 4352.30

And Besides: No tie rods; no tie plates; no cross bonds; narrow trench (7 ft. instead of 9 ft.); 50% labor saved in track construction below base of rail. Concrete foundations bear up well under heaviest traffic.

Ask us for proofs

INTERNATIONAL STEEL TWIN TIES

Prompt deliveries made from stock.

Permanent Track at Less Cost
Any Type Base — Open or Paved Track

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Manufacturers of Steel Twin Ties and Crossing Foundations
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REILLY'S WOOD PRESERVATIVE OIL

PATENTED

Water-Proof Weather-Proof Time-Proof

R. W. P. O. gives maximum penetration because it is free from tar and other viscous adulterants. And it stays in the wood forever, affording permanent and effective protection to every treated timber.

R. W. P. O. is acknowledged to be the highest grade oil known for preserving wood by the open tank or brush methods.

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as Long as the Preservative."*

R. W. P. O. gives 100% protection
—for it outlasts the wood.

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Indianapolis, Indiana

PLANTS: Indianapolis Minneapolis Seattle Mobile Norfolk



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Capital of the Lone Star State
Another ESSCO Better Service Town

The Austin Street Railway was one of the first to see the many merits of the Light-Weight Safety Car.

In planning to provide this improvement for its patrons, the company gave careful thought to the specialties for the car as well as to the type of car.

And this was its decision:

"Golden Glow" Incandescent Headlights
Faraday High Voltage Car Signals
Keystone Trolley Catchers
Keystone Rotary Gongs
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Manufacturer of Railway Material and Electrical Supplies

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17th and Cambria Sts.

NEW YORK
50 Church St.

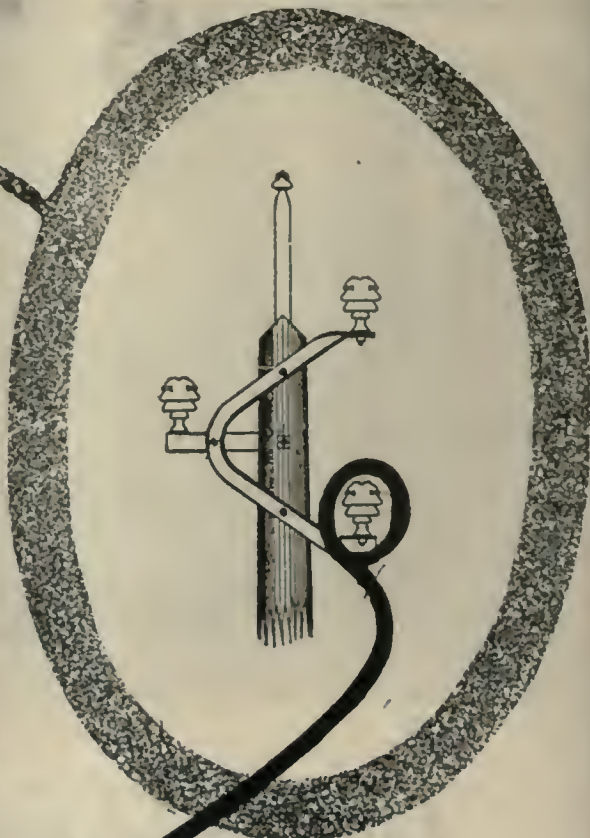
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Monadnock Bldg.

Canadian Distributors: Lyman Tube & Supply Co., Montreal, Toronto, Winnipeg.

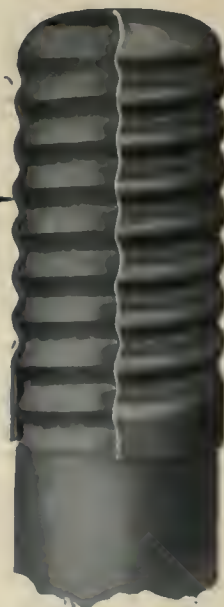


One 33,000 volt line on Bo-Arrow arms and Peirce Forged Steel Pins. Two 33,000 volt lines on Steel Angle arms and Peirce pins. (Pittsburgh, Pa.)

Bo-Arrow Arms and Peirce Pins



A close-up view of the forged steel Peirce Pin for high-tension lines. The threads of the thimble fit loosely over the threads of the pin, and a thin cork disc is provided between the top of the pin and the thimble. Under expansion the pin simply rides up further in the thimble, the cork disc compressing. None of the strain is communicated to the insulator.



Guaranteed to stand rated strains without danger to the insulator.

The Hardware MAKES the Line—Hubbard makes THE Hardware

HUBBARD AND COMPANY
PITTSBURGH

Canadian Manufacturers and Distributors: Acme Stamping & Tool Works, Hamilton, Ontario



A Motoress on a Car In Ancient Rome

National Pneumatic Door and Step Control GETS THE FARES

One of our shrewdest electric railway men said lately that air brakes would pay for themselves if they did no more—

Than remove the temptation of the motorman to skip intending passengers.

Exactly the **same** reasoning holds

for the use of **air-operated doors** at either end of the car—

Because the operators of front-entrance cars will accept **every** person who offers to ride—

While the conductors of rear-entrance cars will be much more likely to re-open the doors for the last-second customer.

**Door and Step Control Is a Powerful Aid
to 100 Per Cent Fare Collection**


NATIONAL PNEUMATIC COMPANY
INC.

50 Church St. New York



515 Laflin St. Chicago

Track Bolts and Spikes



Don't get the idea that Lackawanna track material includes only rails, joint plates, splice bars and tie plates.

We also make track spikes in all the standard sizes for light and heavy rails, and track bolts with rolled or cut threads to meet the usual railroad requirements.

Send for our booklet on spikes and bolts and let us have your next inquiry for these supplies.

313

Lackawanna Steel Company

LACKAWANNA, N. Y.

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BOSTON
BUFFALOCHICAGO
CINCINNATI
CLEVELANDDETROIT
NEW YORK
PHILADELPHIAST. LOUIS
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HAVANA



BECAUSE of the many requests that we have received asking us to rent our DYNAMOTOR for rail bonding, shop-welding and building up cupped rails, we have inaugurated a selling plan whereby small monthly payments may be made; all rent to apply on the purchase price, if it is decided later to keep the machine.

The superiority of the LINCOLN DYNAMOTOR, from the standpoints of efficiency and economical operation, has been demonstrated by many street railway companies. The monthly saving by using our DYNAMOTOR will amount to more than three months' rental.

This is an opportunity for you to equip properly for rail bonding, shop welding and repair work, without having to charge the entire price of a machine to your operating expense or machinery investment account. Just place us on your payroll.

Full details regarding the plan will be given you if you fill in and return the coupon.

This is an exceptional opportunity for you—get busy!

**THE
LINCOLN BONDING
COMPANY**

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New York Office: 30 Church St.**

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PITTSBURGH, Electrical Engineering & Manufacturing Co.
CHICAGO, Holden & White, Inc.
ST. LOUIS, W. L. Rose Equipment Co.
CANADA, Lyman Tube & Supply Co., Ltd., Montreal, Toronto, Winnipeg.

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Lincoln
Bonding Co.
Cleveland, O.**

Please give me details of
your new rental plan for
Lincoln Dynamotors.

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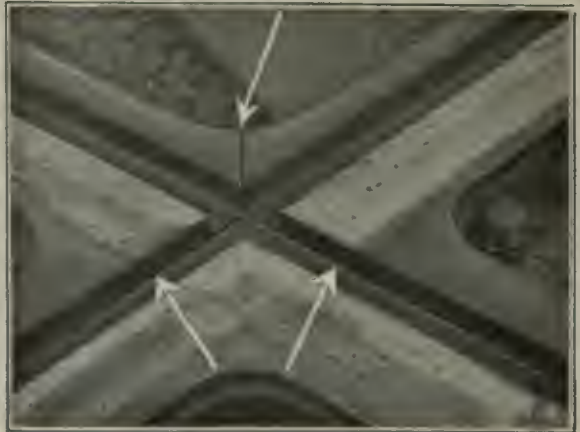
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What Happens to a Rolled Rail Crossing



Joints in Balkwill Articulated Cast Manganese Crossings are life savers. They positively prevent breakage at flangeway intersections, permitting 100% wear before renewal

Why Balkwill Articulated Cast Manganese Crossings Are Superior to Rolled Rail Crossings

This picture at the left shows where breaks in the main steel filling or backbone of rolled rail crossings are usually found.

These breaks are unavoidable because of the lack of flexibility of the rolled steel filler at the flangeway intersection.

In the Balkwill Articulated Cast Manganese Crossing the difficulty is

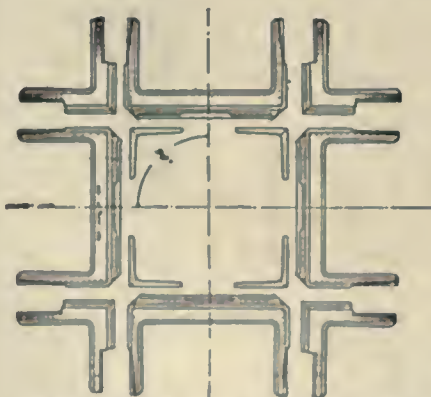
corrected by placing scientifically designed joints at the very places where breakage formerly occurred.

The lower first cost of a rolled rail crossing is therefore not a lower overall cost because it takes several rolled rail crossings to equal the life of one Balkwill Articulated Cast Manganese Crossing. Therefore the Balkwill Crossing is the cheapest in the long run. It gives

MORE WEAR PER DOLLAR THAN ANY OTHER CROSSING YOU CAN BUY

It saves interruptions to traffic, makes less demand on labor, which is now so scarce, and also reduces the cost of making replacements frequently.

Write us for data on existing installations. If your special work manufacturer cannot get prompt deliveries of manganese castings or has not taken out a license to manufacture these crossings, **DON'T ACCEPT A SUBSTITUTE** but write us direct and we will see that your requirements are taken care of.

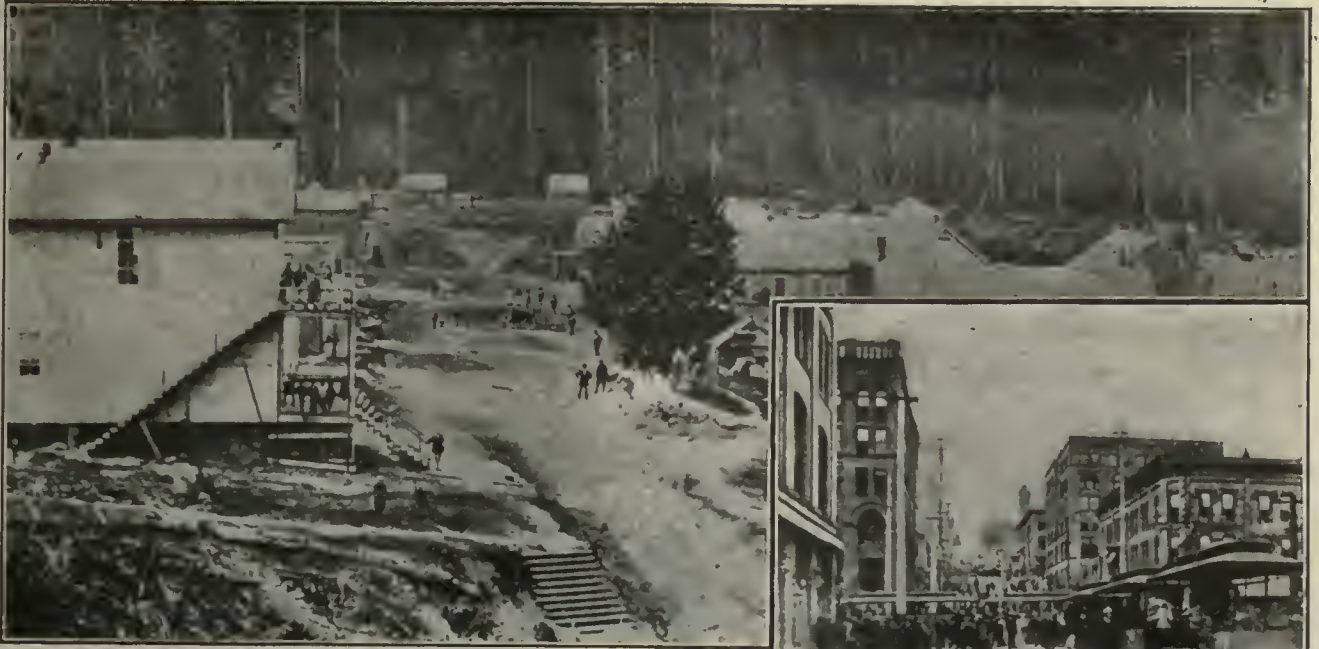


Joints at the flangeway intersections of Balkwill Articulated Cast Manganese Crossings positively eliminate breakage

Order Balkwill Articulated Cast Manganese Crossings
Direct from Your Special Work Manufacturers

The Balkwill Manganese Crossing Co.

506 Williamson Building, Cleveland, Ohio



TACOMA, WASH.—The city with a snow-capped mountain on its doorstep. When this picture was taken in 1873, the Northern Pacific R. R. had just decided to make this spot its Puget Sound terminus—and Tacoma was born! There were 73 people living there at the time—most of whom are in the picture. The small photograph shows the same spot 30 years later.

Eleventh Street at Pacific Avenue.

The Electric City

is Tacoma's popular nickname—and most deserved, too. For within its corporate limits it commands greater natural power resources than any other locality in the world, with the sole exception of Niagara Falls. The wonderful plant at *Electron*, controlled by the Puget Sound Power Co. (Stone & Webster), uses in one of its power houses a waterfall which drops 887 vertical feet through 1700 feet of piping, reaching a nozzle speed of 3 miles a minute and a pressure of 400 lb. to the square inch. The total horsepower available in this and the other falls and streams near Tacoma is estimated at 200,000.

Coal from 59 mines in Western Washington can be

sent into Tacoma by simply loosening the brakes on the cars—gravity does the rest. Among its curiosities is a solid block of coal 16 feet long and 30 inches thick, weighing 16,000 pound. This block was mined in 1890 and formed one of the attractions at the exposition in 1891, when President Harrison visited Tacoma.

Because of Tacoma's exceptional water power, electricity is cheap and plentiful. The electric railroads of the Northwest and high-speed, long-distance electric transportation have been carried to a high degree of perfection, affording easy and convenient means of intercourse between Tacoma and the cities and towns within a radius of fifty miles.

Galena Oils and Galena Service

have been an important factor in the development of electric railway equipment and in the speeding up of electric railway service, not only because they have furnished lubricants of high quality, but because these high-grade lubricants made better railroad service possible.

Galena-Signal Oil Co.

Franklin, Pa.

For Your Inspection

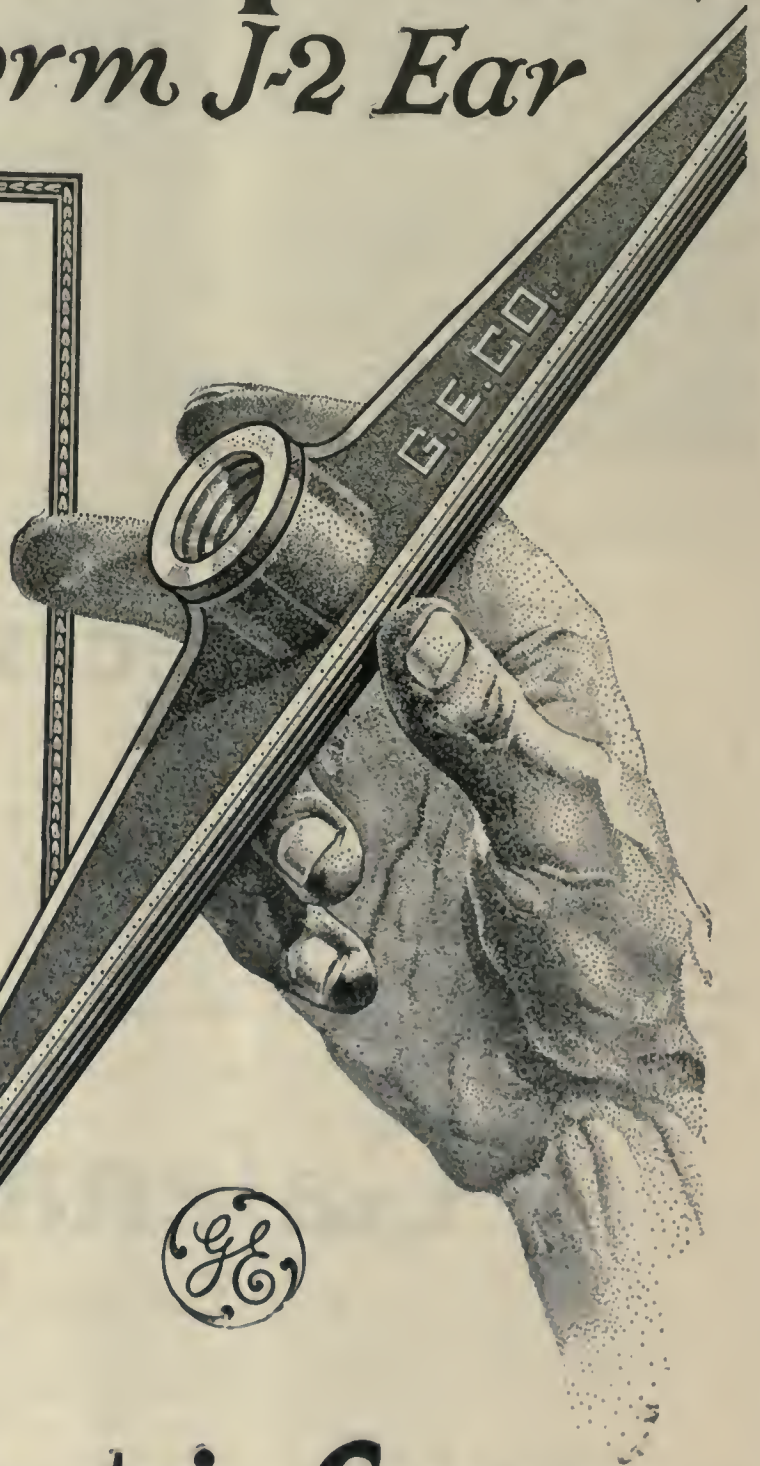
The Form J-2 Ear

The machined fit of the J-2 Ear bears snugly against every side of the trolley wire. This kind of contact gives the greatest amount of holding power possible in a clinch ear.

The lips are also machined to thickness.

G-E Standard Alloy Ears will give you the kind of service that counts.

Stock shipments in any reasonable quantity



General Electric Company

General Office: Schenectady, N. Y.
Sales Offices in All Large Cities

Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

Volume 52

New York, Saturday, July 13, 1918

Number 2

Increased Postage Rates in Effect

NEW rates of postage on magazines became effective on July 1. These increases are material, particularly at distances of more than 300 miles from the place of publication. The obvious step would be to raise the subscription rates in distant zones to cover the added postage.

For the present, however, the publishers of the ELECTRIC RAILWAY JOURNAL have decided not to increase the subscription price, trusting that in the interests of national unity Congress will before long repeal the zone law and revert to the universal flat-rate system. The importance of such a policy is especially evident now when united action along lines of nationwide efficiency is so necessary.

Why Sell Transportation Cheapest When it Costs the Most?

THE dawn of reason in the sale of electric railway transportation may be discerned in the Bay State Street Railway's plan to charge less instead of more for off-peak riding. We wonder who it was that first conceived the idea of carrying people for less money during the rush hour. He must be quite dead by this time, for the custom dates back to the early European steam railways. Then there may have been an atom of sense in it, for anyone who has traveled fourth class in Europe will admit the possibility of making money at any rate of fare when people are put in a cattle car. In Canada and the United States, however, it is customary to give as good accommodation on the workmen's ticket as on the full-fare ticket. In the few cases where fertilizer experts or coal miners have been segregated the welkin has clanged with indignation.

Not content it seems with subsidizing the suburbanite, the electric railway has also felt obliged to hand something to the once-humble son of toil. We say "once-humble" advisedly for it is only the manual worker, whether in factory or shipyard, who has been able to outstrip the rising cost of living. There is something grossly unfair in making a \$20 a week clerk pay full fare at 9 a.m. for the short ride to the business section while at 7 a.m. the \$40 a week mechanic pays half as much for the usually longer ride to a factory district. We venture to prophesy that if the peak period carried an extra rate as light and power loads do, the labor organizations would force their employers to put through a staggered hour plan in double-quick time. The Bay State change is the first plunge in the right direction. May it succeed and inspire others to put fares on the basis of selling on some common-sense relation to cost.

Commutation in Direct-Current Machines in the Limelight Again

FOR a number of years that former *bête noire* of the electrical engineer, sparking and flashing at the commutators of direct-current motors and generators, has troubled neither the waking nor the sleeping hours of the manufacturer or operator of electrical machinery. There was a time, within the memory of engineers still far from old, when this difficulty threatened the further development of direct-current apparatus, and it certainly furnished a great stimulus to the progress of the rival alternating current. As soon as the theory of sparking and flashing was thoroughly understood suitable correctives were applied and the "black beast" vanished into the obscurity whence he came.

Credit for this happy consummation must be given largely to those engineers of scientific mind, who reasoned that if sparking and flashing are due to the unwillingness of an armature coil to have its current reversed as its terminal passed out from under the brush, then something must be done to force this reversal. Two means were found for this purpose and both are in use in all commutating machines to-day. One is to generate in the armature coil while it is short-circuited by the brush an electromotive force in a direction opposite to that produced by the reversal of the current. The commutating pole is the full development of this principle. The other means for improving commutation is the introduction of resistance into the circuit of the short-circuited coil. This is the primary cause of the success of the carbon brush which has done more than any other one device to bring about the present satisfactory condition at the commutator. In practically all of this progress the aim was to remove the source of the trouble and hence the trouble itself. An exception, of course, was the use of air jets at the brush tips to chill the "sparks" in the early Thomson-Houston arc generator, but this was a highly special machine, and it was successful in spite of its commutator rather than because of it.

Within a few years past the high-frequency (60-cycle) rotary converter, the high-voltage generator for heavy traction and the automatic substation, all electric railway machines, have forced attention again to commutation. The difficulties now are largely those incident to short-circuits, which impose a heavy task upon the commutating ability of a machine. At the same time they occur only occasionally. Hence it would appear to be logical to prevent the evil effects of flashovers by external means rather than radically to change the internal design so as to make it practically impossible for a machine to flash over. No doubt this could be done

but results would not justify the cost and probable clumsiness of an inherently non-flashing rotary or generator for the special classes of work mentioned. Two radically new such external devices have recently come into prominence, in one of which the armature is short-circuited to prevent damage, while in the other flash barriers and arc coolers are mounted around the commutator. Both are apparently beyond the experimental stage. It will be interesting to see if either or both persist as a permanent anti-flashover device. Experience only will tell.

It Is No Time to Drift, and There Is No Time to Do So

COMMENTING upon the editorial in our issue of June 29, entitled "The Debacle or the Dawn," the *Philadelphia Ledger* agrees that "the plea of the electric railways for a generous and broad treatment of the situation is a just one." But after stating that "no general order governing rates could possibly meet the infinite variety of conditions governing electric railways in different localities," the *Ledger* concludes its remarks as follows:

"The absence of uniformity surrounding conditions under which these public utilities operate makes it more than doubtful whether a solution is going to be reached by any such hasty action by the federal government as is now advocated by the railroads."

All of which makes one think of the rhyme regarding the mother who, when asked by her daughter if she might go for a swim, naively abjured her:

"Yes, my darling daughter;
Hang your clothes on a hickory limb
But don't go near the water."

Of course there are different situations in different localities. To that very point our editorial directed specific attention. The situation cannot be met either as to wages or as to fares by any general order covering the electric railways as a whole. What we did say and still maintain is that it is perfectly proper that the War Labor Board should consider the *wage* problem of the electric railways and that it should establish bases of minimum wages *in accordance with the conditions of life in the different communities and without primary reference to the financial ability of the companies to pay.*

As a corollary of that proposition, it is suggested that the War Labor Board should take steps to aid the electric railway companies to meet the bases of wages thus established.

It is clear to anybody that if the slow-going processes of adjustment by local authorities, responsive to local prejudices based on local political aspirations, are permitted to interfere with the prompt solution of this fundamental problem, the result will be the debacle and not the dawn. In other words, what is clearly needed to save the electric railway industry from disaster is a change of venue.

Washington can deal with this situation from the point of view of national interest, and to the national government alone can the electric railways look for settlement of the problem on a natural basis.

That does not mean that Washington will not inquire into local difficulties and into local situations; it does mean that the authority from which action will proceed will be Washington and not the local governing agencies.

Washington will have to subdivide its authority and act on the basis of recommendations and investigations, but what it does will be and should be in recognition of the conditions which confront the nation as a whole, rather than with reference to the trivialities of local prejudices and local politics.

We understand that the War Labor Board is to render in a few weeks its decision in the pending cases. Between now and that time it will have ample opportunity to consider its rights and prerogatives. There is no question that the War Labor Board will substantially increase the wages of the men employed by the companies whose cases have been brought specifically before the board. There is no question that this will have a very great influence on the whole situation affecting electric railways throughout the country. But if the subject is left there, it means disaster to the companies financially, and it ultimately means a series of wholesale receiverships or taking over of the electric railways by the federal government. This latter course is absolutely unnecessary and ought to be avoided at all hazards. There could be no more perfect advertisement of the failure of democratic government than that the nation should be forced to take over the electric railways because local authorities refused to permit them to earn sufficient revenues to keep in them the breath of life.

The alternative is clear: either the federal government, through the recommendation of the War Labor Board, should take such steps as will induce local authorities to make a proper adjustment of street railway charges, or it should avail itself of its implied powers to regulate the whole situation in the national interest.

If the state commissions or municipal governments were alive to their obligations, the situation would be adjusted immediately by them to permit adequate earnings. No company should be permitted to make anything out of the war, but every company should be permitted to maintain its full efficiency during the war, and there is the highest presumption that the conditions existing before the war were, in general, not unreasonable. In fact, the most superficial examination of electric railway conditions shows that for many years prior to our entry into the war, the trend was steadily against maintaining the earning power and the financial integrity of these companies.

It is no time to drift. There is no time for it. As Mr. McCarter says in his message this week: "All should recognize the full measure of the problem involved in the greatest catastrophe that has overtaken the world." Every electric railway company should bring the facts in its case, as aggressively as it knows how, to the notice of everybody concerned. Only by the most complete ventilation of the facts can the public be aroused to the situation. Once the public is aroused, local authorities will trail along according to their time-worn habit.

In the meantime, and pending a treatment of the problem fundamentally, we are justified in expecting the federal government to deal as the national interest demands with this vital problem. For the impulse to deal with it in such a spirit, we look with complete confidence to the national War Labor Board, presided over by ex-President Taft and Frank P. Walsh.

What Constitutes a Fair Rate of Return in War Time?

THE question of a proper rate of return on utility investment during war time is a live topic, and for this reason we think our readers will welcome Professor Bauer's article this week, whether or not they agree with him on all points. His primary thought is that the proper answer does not lie along the line of extremism in favor of either the stockholder or the public. On the one hand, the public has no right to insist that inadequate returns on investment shall not give rise to fare increases; on the other hand, the security holders have no right to expect that their former returns will be raised to counteract fully the now low purchasing power of money.

We imagine that much of the existing confusion is caused by the infrequent expression of the fact which most men must recognize—that the rates of return on old and on new utility investments need not be the same. It is obvious that the capital cost for new investment must depend upon the exigencies of the money market, and it is equally clear that no practicable means exists for readjusting the return on old investment in accordance with current conditions. It may be a fine theoretical idea to conceive of the real income of security holders being maintained in accordance with the changing worth of money, but such a procedure could not fairly be adopted for utility investors to the exclusion of all others. To make such a plan universal would mean a revolution of the whole investment system—an utterly impracticable proposition.

Those interested in old utility investments, however, are thoroughly justified in demanding the maintenance during war time of the rate of return judged fair in pre-war days. Where the prior investment has been determined there should not be a minute's delay in granting a fair return to all investors. The situation is complicated by the fact that so much indefiniteness exists in regard to old utility investments. Both the

companies and the commissions have been at fault because of their mutual distrust. Now the prolonged bickerings should be ended. In cases of undefined investment the commissions should hasten to grant the necessary fare increases to provide for operating expenses and fixed charges. This will at least save the railways until a more equitable program is developed, based possibly at first on the average pre-war earnings but eventually, when there is opportunity to develop it, on fair appraisals of the property used and useful in the public service. Delay for appraisals now, however, would be most unjust.

As for new capital, this must be paid for, as before stated, at current market prices. Some men appear to believe that the maintenance of different rates of return upon old and new investments involves practical difficulties. Such is not the case. By the sale of new bonds at a discount, or the attachment of preferential rights to the new securities, the higher rate of return on new capital can be easily managed. The fundamental requirement now is that the net income must be sufficient to pay the fair rate of return upon the old investment and the also fair, though higher, rate upon the new. Similarly, in a period of declining interest rates, the net income must suffice to meet the rate of return judged fair when the old investment was made and in addition the fair, though lower, rate upon the new. The propriety of this fundamental principle has been recognized in New York and other partnership contracts, and it is only reasonable to expect that it will be recognized by regulatory bodies in all cases.

The public, however, does not sufficiently realize that the conditions governing the acquisition and the disbursement of railway net income are subject to change, and that therefore the net income itself must be correspondingly alterable. To educate the public to an understanding that all franchise agreements and regulatory laws must permit this is the duty of the commissions.

Preservation of Utilities a National Necessity

THIS COUNTRY is now alive to the fact that it is to be the decisive factor in the winning of the world war and its men and resources are being mobilized with astonishing results. The people in general are prepared for sacrifice. The flower of the land are readily going forth and the people are accustoming themselves to previously unheard of taxes and are generously contributing to all war funds and to the support of the government through the purchase of bonds. Money does not count as against the rightful settlement of the great conflict, but the public does not seem to realize that the preservation of the utilities, by maintaining them in a high state of physical and financial efficiency, so that they can carry on the tremendous work already intrusted to them and obtain funds for increases in plant made necessary by the war, is a national necessity of prime importance, without which no other substantial war industry can be operated to the maximum of its efficiency. Why spend billions for war work of one kind and another and neglect to provide the pennies necessary for the electric railway industry, if it is to keep the wheels of shipyards, munition works, aircraft factories and cantonments revolving? This is no time for the harboring of old-time prejudice, but all should recognize the full measure of the problem involved in the greatest catastrophe that has ever overtaken the world.

Wm. M. Carter

Chairman American Electric Railway Association War Board.

International Railway Installs Steam Turbine in Unique Location

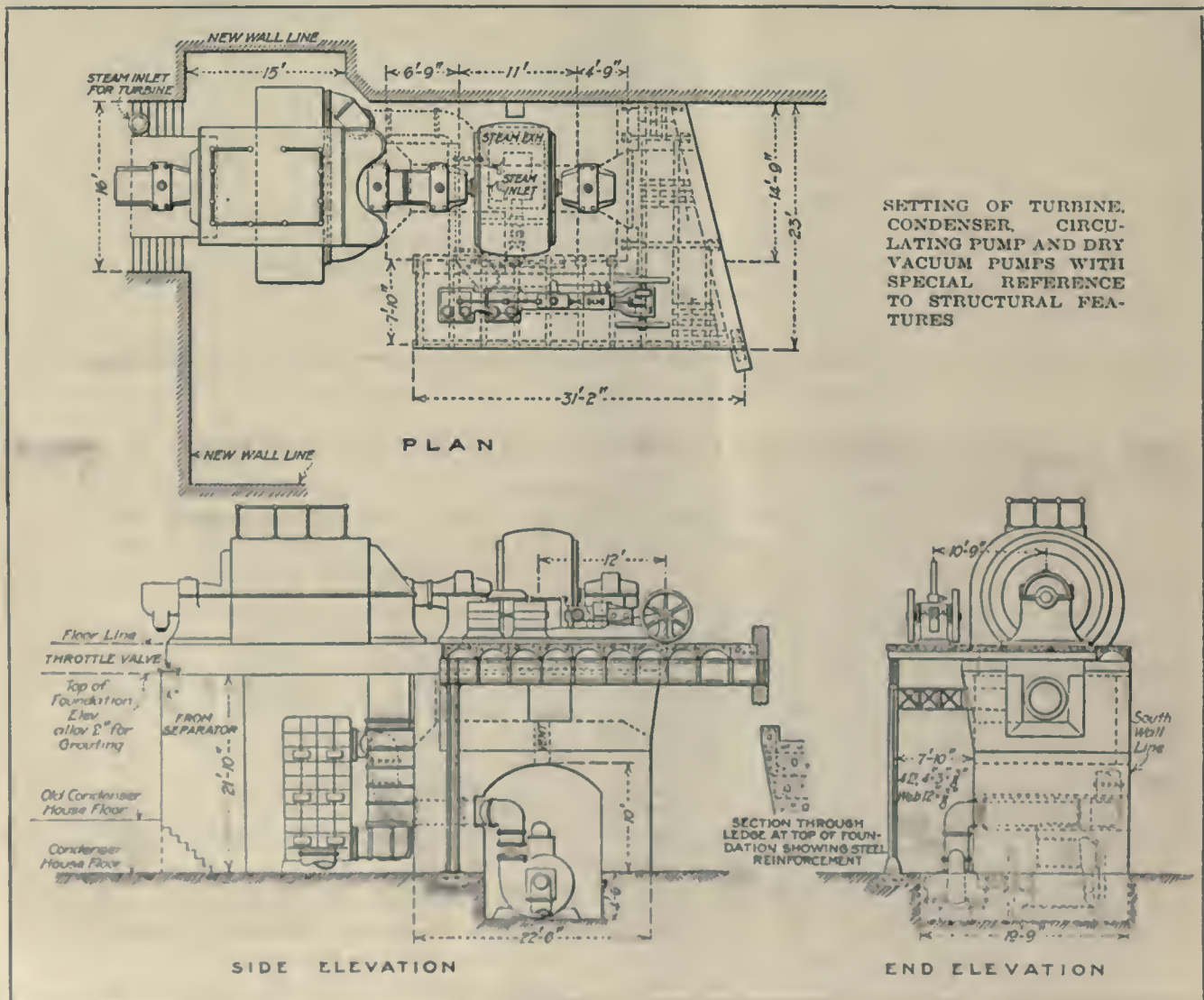
For a Peak-Load Power Supply a 5500-Kw. Second-Hand Turbine Was Purchased and Installed on the Ledge of a Rock Under the Niagara Street Power House

AS PART of the general power system improvements on its property, the International Railway, Buffalo, N. Y., has partly remodeled the famous old Niagara Street power house in Buffalo. A preliminary account of the changes was given in the issue of the *ELECTRIC RAILWAY JOURNAL* for April 14, 1917, page 683. At that time reference was made to the future addition of a steam turbine to the plant equipment. This increase in power capacity was made necessary partly by the limitation in available water power and partly by the augmented demand for power. The turbine was installed last fall and after a preliminary limbering up took its full load towards the end of November. Since that time it has been giving excellent service and supplementing the

peak load carrying capacity of the storage batteries and hence keeping down the charges for excess power.

The turbine is of 5500-kw. capacity and it was purchased from the Long Island Railroad. It is a three-phase, 25-cycle, 1100-volt machine, of Westinghouse-Parsons type. It operates at the steam pressure of 150 lb. per square inch with no superheat. The turbine was bought from the railroad company complete with piping, and in its installation at Buffalo the fittings that came with the machine were utilized as far as possible.

There was no exciter with the turbine, but a second-hand machine was bought from another source and installed at the same time. For reasons to be explained the turbine unit was set deep in the rock

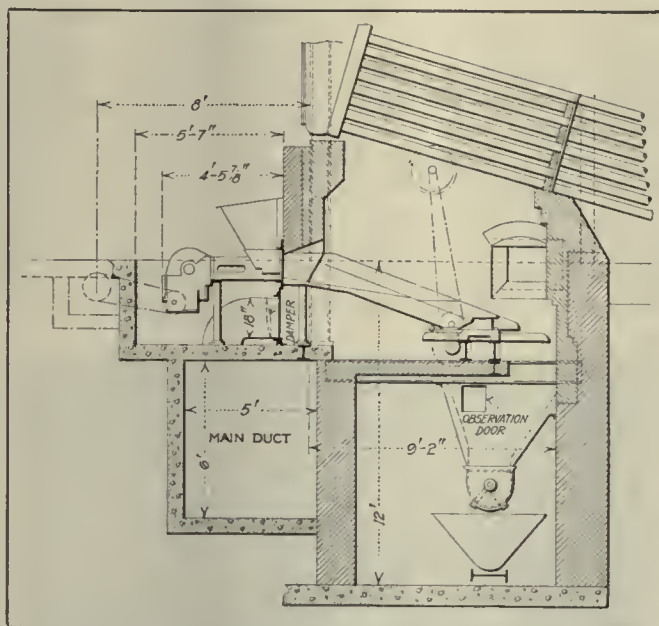


underlying the plant, but the exciter was placed in the old engine room.

It will be remembered that the Niagara Street power plant is situated on a rock ledge high above the Niagara River. As the river is the source of circulating water it was necessary to set the turbine and condensers at a very low level to economize power in circulating condensing water. Moreover, the capacity of the available circulating pump was limited, so that to avoid the purchase of a new pumping outfit there was an additional reason for setting the equipment at a limited elevation above the river level. When the original power plant was built a certain amount of excavation was made in the rock ledge for the purpose of accommodating pumps, etc. In the remodeling this excavation was utilized to the limit and enough additional rock was excavated to provide room for the removal of the condenser tubes. As finally arranged the turbine was set 23 ft. below the level of the old engine room floor, and the condenser house floor was placed 21 ft. below this. In addition a pit 4½-ft. deep was excavated for the circulating pump.

It is difficult to show the complete layout by means of drawing on account of the nature of the rock excavation. One of the accompanying illustrations shows the most important dimensions.

The turbine is supported on a concrete foundation and its floor is extended to accommodate the vacuum pump, piping, etc. The pump rests upon a floor extended out from the turbine foundation and supported



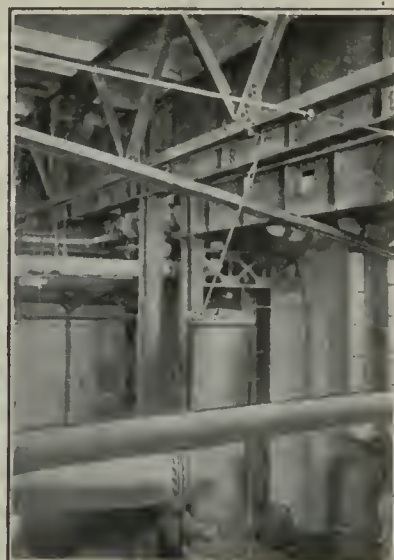
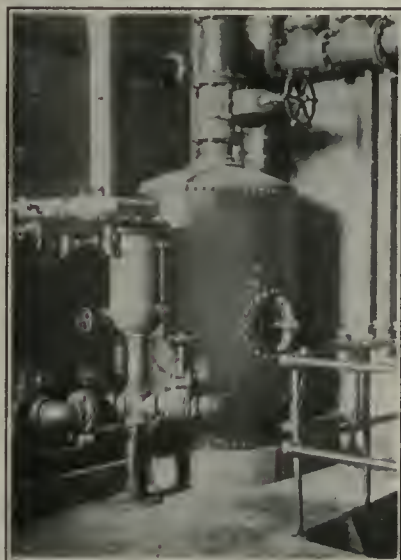
CROSS-SECTION OF BOILER SETTING SHOWING FURNACE, ASH PIT, AIR DUCT AND STOKER PIT

at one corner on a steel column, at a second corner from the wall of the building and along one edge by a projection from the turbine foundation. Under one edge of the floor is a 16-in. I-beam, and resting on the batten projecting from the turbine wall is a 12-in. I-beam. The concrete floor and foundations were all poured at once with foundation bolts in place.

On account of space limitations it was necessary to utilize every square foot of space under the turbine for the accommodation of the circulating pump and the condenser. The condenser is of the Alberger surface type, with a centrifugal circulating pump of the same make driven by a Westinghouse "Kodak" engine. This pump with its engine are directly under the generator end of the turbine in a tunnel molded in the concrete foundation. The dry vacuum pump, already referred to as being on an extension of the turbine floor, is also of Alberger make, reciprocating type.

The condensate pump, located on the condenser house floor but not shown in the drawing, is of the centrifugal type and it is driven by a General Electric direct-current constant speed motor of 20-hp. capacity. This pump was purchased new.

One of the most interesting features of the plant is the oiling system in which the gravity plan is used. It comprises a storage tank of a capacity of 1000 gal., and a Turner filter of 700-gal.-per-hour capacity is connected in the oil circuit. Two small steam pumps are used for circulating the oil. The storage tank is lo-



AT LEFT, DRIP TANK AND ACCESSORIES. IN MIDDLE, CONNECTION TO CIRCULATING PUMP. AT RIGHT, GIRDERS FOR SUPPORTING TURBINE AND AIR PUMPS

cated on the upper level of the plant and supplies oil at 4 lb. per square inch pressure.

Among other equipment in the turbine room worthy of special mention is the steam separator of the Sweet type. The separator is a steel cylinder 52 in. in diameter and about 8 ft. long. It is supported on springs designed by the railway company's engineers, for the purpose of taking up expansion and contraction. The separator is hung on brackets from one of the I-beams supporting the turbine, the weight being taken on the steel springs which are 6 in. in diameter, 8 in. long and made of four turns of 1-in. stock.

In connection with the separator, and to take care of the discharge from it and the pipe line, a steel drip tank $3\frac{1}{2}$ ft. in diameter and about $5\frac{1}{2}$ ft. long was installed under the separator. Bundy traps are used to remove the water. From this tank the water is pumped back into the condensate lines. A very convenient annunciator, consisting of a box divided into sections, with suitable lettering on the



STEAM-DRIVEN EXCITER PLACED IN OLD POWER HOUSE

location of the feed heater was complicated by the fact that space in the firing aisle of the boiler room was limited and it was necessary to have room to remove boiler tubes and parts of the boiler feed pumps. The arrangement of the pair of Cochrane heaters on the steel structure is shown in the same drawing.

The boiler feed pumps referred to are of Worthington make, pot-valve type, duplex compound, outside packed plungers, 14 in. x 20 in. x 10 in. x 15 in., having a maximum speed of sixty-five strokes per minute. They are now running at fifty strokes.

The boiler house contains nineteen Babcock & Wilcox boilers, formerly equipped with Roney stokers. Later fifteen of these stokers were replaced with Riley underfeed stokers in order to permit of forcing the boilers. The remaining four boilers are now entirely laid up. The combined capacity of the newly equipped boilers is 3450 hp. and they can be forced to 250 per cent of rating. The warm air taken from the boiler room is forced into the



VIEW THROUGH DOORWAY INTO TURBINE ROOM



TWIN FEED-WATER HEATER EQUIPMENT IN BOILER ROOM. (See drawing on page 47)

glass covers and with provision for lighting one or another of the sections as required, was installed on the wall opposite the steam end of the turbine unit. This, like many other conveniences about the plant, was of "home-made" construction.

PROVISION FOR HEATING THE FEED WATER

While the turbine was being installed improvements were being made also in the boiler room. The most important one was the installation of two Cochrane open feed heater units, each having a capacity of 4000 hp. These heaters are mounted on a framework made up of old angle-iron built-up trolley poles, thus utilizing scrap material. A section of this framework is shown in an accompanying drawing. The boiler feed pumps are located below this structure. The

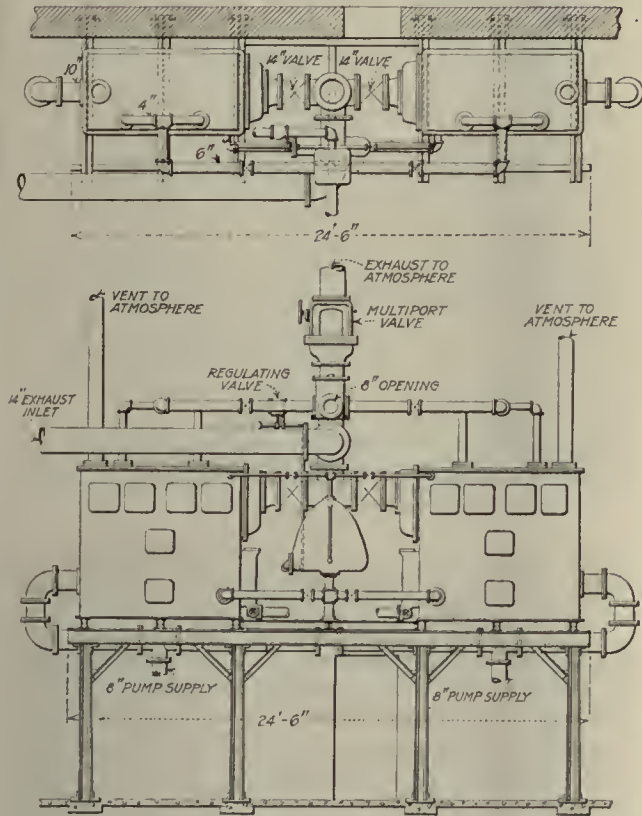
furnaces through a 5-ft. x 6-ft. conduit in the floor directly in front of the boiler setting as shown in cross-section in one of the figures. Soot pockets were also placed under the boilers.

The air supply is from two Sturtevant multivane fans driven by steam turbines of 113 b.hp. capacity. Each fan has a rating of 55,000 ft. per minute at 6 in. of water pressure, if needed, the usual value being 4 to 5 in. The fans are 44 in. in diameter and the speed is from 1400 to 1500 r.p.m., being controlled by means of an automatic regulator which in turn is controlled by the steam pressure.

The changes in the Niagara Street power plant are, of course, rather special. The material source of power for the International Railway is the water power in which the neighborhood abounds. However, the

restrictions upon the use of this water power imposed by the government are such as to make necessary the use of steam power, and this condition will presumably continue for many years to come. In addition the water power is necessarily sold on a "firm power," or twenty-four-hours-per-day basis, very high charges being made for excess power. This makes it economical to use a steam plant which is less economical than one designed to furnish the entire power supply for an electric railway.

Only occasionally would it be necessary to install



DOUBLE-UNIT ARRANGEMENT OF FEED WATER HEATERS AND PURIFIERS MOUNTED ON FRAMEWORK SUPPORTED BY OLD TROLLEY POLES

a steam turbine under space restrictions as occurred in the present case. However, there are general lessons to be learned from such special cases, particularly when the exigencies of war time require unusual ingenuity in accommodating material in hand to the time and space requirements. Special credit is due G. W. Dunlap, superintendent of power of the company, for the design and carrying out of the layout of this extension to the plant. A part of the output of this plant will be used for the operation of the new high-speed line between Buffalo and Niagara Falls.

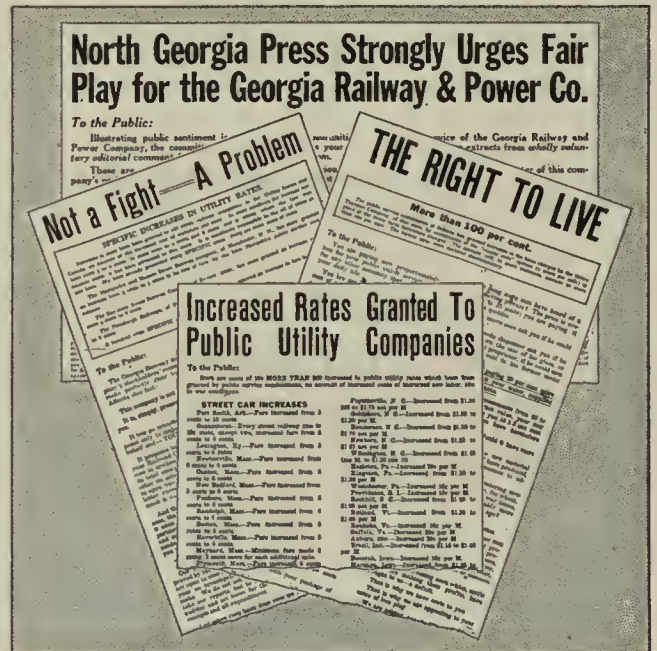
Various ways of cleaning brake rigging are used in different shops. Most companies use elbow power and a few use acid. However, Jesse M. Yount, master mechanic, United Railroads of San Francisco, has a still more effective way. The dirty, incrustated brake rigging is simply put into a furnace until it reaches a cherry red heat, by which time all of the dross has been burnt off.

Stockholders Tell Atlanta's Story

Why the Georgia Railway & Power Company Needs Higher Rates Is Ably Set Forth in a Newspaper Campaign Covering Northern Georgia

WHILE the Georgia Railroad Commission is the only body legally empowered to grant relief, the Georgia Railway & Power Company, Atlanta, Ga., has naturally been anxious to have the general public know the facts in regard to its pending application for increased rates. Hence it began during the middle of April an intensive newspaper campaign to show why it needs higher rates for gas, electric light, electric power and electric railway service, the new charges for the last covering a 6-cent fare and a 2-cent transfer charge in the city of Atlanta.

The most striking feature of the newspaper campaign is the fact that the advertisements, frequently of full-page size, were signed by a committee of stockholders, all of them being prominent Georgians. It was felt that this method, if any, would make it clear that the company was not merely a corporation but a group of sincere investors, many of whom were personally interested in the prosperity and the well-being of northern Georgia. The signers were aided by the manage-



SPECIMENS OF ADVERTISEMENTS USED BY GEORGIA RAILWAY & POWER COMPANY TO TELL STOCKHOLDERS' STORY

ment in securing the basic data, and the copy itself was written by an Atlanta publicity man.

The advertisements, of which specimens are shown in the accompanying illustration, have taken up in turn the different branches of the company's activities. In one electric railway advertisement, the company published a long list of cities in which fare increases had been granted. In another it commented on the reasons for this general tendency, and in a third it discussed increases in the cost of newspapers and other articles. In a fourth it gave specific examples of increases in the cost of labor, including a 41.4 per cent increase (\$52,890) in its own payroll and that of the Atlanta Gas

Light Company for April, 1918, as compared with April, 1916. Other advertisements quoted the recent correspondence between President Wilson and Secretary McAdoo, and the monograph of John Skelton Williams.

During the campaign the Atlanta newspapers made no editorial comment on the merits of the case, apparently waiting for developments at the hearings before the commission. The papers of northern Georgia, however, are giving the company strong editorial support under such captions as "Let Us Be Reasonable," "A Just Claim," and "Demands of Justice Must Be Met."

As far as the merits of an increased fare for Atlanta are concerned, it may be pointed out that straight 5-cent rides in that city are now as long as 9.5 miles, and with transfers 18 miles or more.

Car-Entrance Street Signs at Pittsburgh

IT WILL be recalled that in the Jan. 5 issue of the ELECTRIC RAILWAY JOURNAL an article by J. F. Layng on "Engineering and Selling Principles Applied to Electric Railway Transportation" directed attention to the ride-selling and time-saving advantages of 100-per cent installation of stop signs and to the location of such signs directly at the car entrances.

P. N. Jones, general manager Pittsburgh Railways, may point with pride to his anticipation of this suggestion, for about two years ago the company began to install "stop" signs, in regard to which it said in a circular to the public:

"Car-Stop Signs.—Have you noticed the round car-stop signs? The motorman stops his car so that it

comes directly under this sign. Will you co-operate with us in saving time by standing directly underneath the sign?

"Car-Stop Signs at Congested Traffic Points ('First Car,' 'Second Car,' 'Third Car') mean that a car stopping at these points will make its stop under the 'First Car' sign if possible. If a car is already at that point it will stop under the 'Second Car' sign. If both places are taken, the car will stop at the 'Third Car' sign.



SKETCH OF PITTSBURGH RAILWAYS' CAR STOP SIGN

Thus, if necessary, three cars can be loaded at once without loss of time. Save time for yourself and others by being at the proper point when the car stops.

"Cars having made a stop under one of these signs will make no additional stop at the same loading point."

The accompanying reproduction of a page from the same circular also shows that the Pittsburgh Railways is doing all it can to promote faster interchange and speedier transportation of its passengers by direct appeal to the passengers themselves.

The stop signs now being installed are of the more convenient rectangular form, as illustrated, in preference to the round shape.

Key Route Went Over the Top Through Good Inside Work

THE San Francisco-Oakland Terminal Railways, Oakland, Cal., was brilliantly successful in securing a 100 per cent subscription to the third Liberty Loan. Nineteen hundred employees bought \$113,150 of bonds, which compares with 708 subscribers for \$44,800 of the first loan and 280 subscribers for \$18,500 of the second loan. The bonds are carried on the basis of payment in ten monthly installments.

The local Liberty Loan committee offered to send four-minute orators around, but the company decided that it would be better to do the work through the department heads who knew the status of each man in his department better than any outsider could. In some cases where an outsider might create a feeling of resentment, the company official would inspire the desire to seek counsel. Each department head acted as a chairman of a sub-committee. The plan of working from the inside as a great family proved thoroughly satisfactory, and was the occasion of a banquet by W. R. Alberger, general manager of the company, to the department heads and their co-workers on the department sub-committees.

Thus arose the Key System War Savings Society which also came through 100 per cent perfect in the second Red Cross campaign. It is now conducting whist parties at which the prizes are Thrift and War Savings stamps. Any profits from dances and other entertainments, to which the public is invited, also are devoted to win-the-war purposes. The volunteer for all this war financing is S. H. Pickhard, purchasing agent and assistant to Mr. Alberger.

Do You Know?

Some Things the People Can Do to Improve the Service:

The cars on each route are spaced at equal intervals at the beginning of each trip. Every car is operated on a definite schedule. Most irregularities in service may therefore be attributed to circumstances over which we have no control.

You, the People, can remove many of these circumstances by—

Boarding and alighting from cars promptly. Not loitering on unnecessary stops.

Providing legislation to keep wagons off the track.

Advocating "One-Way Traffic" where it is possible, and Switches, Curb and Loops to permit the use of "Pay at Entrance Cars."

There are two sides to every story. Poor service hurts us as well as you. Constructive criticism is invited.

EXTRA CAR STOPS—A LOSS TO EVERYBODY

The location and number of car stops are arranged for the greatest good to the greatest number. Any additional stops are a loss because—

Car Stops Lose Time.—The average delay to a car is 15 seconds per car stop. It does

not take many stops to lengthen the time of a trip by several minutes.

Every Stop Means a Slow Down and a Start.

Stepping the Car is Uncomfortable to Passengers.—Passengers must brace themselves against the change in motion in stopping a car.

Stops are Noisy.—The rubbing of the brake shoes on the wheels and the operation of the braking mechanism unavoidably increase the noise.

REMINDERS

Please have the exact fare ready before boarding car.

Please do not block the doorway of the car.

Please move up front.

Please leave by front door.

Do not forget to ask for your transfer upon paying fare.

Avoid misunderstanding by always stating the number of fares paid.

Our motto is "Safety Always." Make yours the same.

Remember that we seek your co-operation to prevent accidents to yourself and others.

Zone System Does Not Cause Congestion

Of-Repeated Analogy Based on European Cities Is False—City Congestion Abroad Is Due to Other Causes—Zone System Is Apparently Needed Here

By FRANK PUTNAM

The North American Company, New York, N. Y.

HERE is a typical editorial comment: "The zone system of street car fares, as a practical proposal for ———, is not even worth talking about. It would be certain to have the effect of herding population in the inner zones, discouraging expansion and suburban growth and creating a new and acute housing problem. It would be a long step backward."

The opinion quoted above is the one commonly held and thoughtlessly uttered by most Americans who have made no practical study of electric railway service. Persons who express such an opinion as if it were indisputable and conclusive of debate on the subject usually cite European cities as proof of the tendency of the zone system to foster congestion.

EUROPEAN CONGESTION NOT DUE TO ZONES

It is true that most of the larger European cities have the zone system of car fares, both on municipal and on company-owned lines. It is true also that most of them are more densely populated than any except one or two of the largest American cities.

But these old cities of Europe had their congested areas long before the first electric railways were built. The zone system did not cause their congestion and has not added to it. On the contrary, it has helped relieve it.

The chief cause of congestion in European cities, before recent times, was their people's need to huddle together within restricted city walls for protection against military attack. The chief contributing cause, within recent times, has been the heavy cost of providing other public services which must be supplied whenever the extension of cheap transportation into outlying regions enables a considerable group of persons to make homes there. New residential districts of this kind must be provided, at the expense of their occupants or of the city as a whole, with drains, sewers, gas, electric and telephone services, pavements, sidewalks, schools and other communal buildings.

During the last forty or fifty years most of the larger cities of central and western Europe have been trying to control city growth, in conformity to scientific city plans, to the end that the people should get ample good service of all kinds without waste of their meager earnings in the construction of such services over larger areas than were actually needed. They have tried to keep down the "overhead," the fixed costs of living cleanly and comfortably in cities. European cities west of Russia have during that period been far more active than most American cities in procuring comfortable, healthful and economical housing for the people. Compared with them, our own cities, like Topsy, may be said to have just "grown."

In most of the larger American cities there has been a vast waste of public and private capital through the

abandonment of comfortable residential districts relatively near to the city centers and through the creation, for the housing of the same population, of new residential districts farther out. Our city governments have permitted obnoxious industries to destroy, without recourse, the residential value of hundreds of thousands of comfortable small homes paid for by wage earners through long years of painful if commendable self-denial. We have permitted the makers of needless smoke and noises to destroy the residential usefulness and value of large sections once inhabited by the rich. We have only too often seen large areas degenerate into "blighted districts," unprofitable to their owners and injurious to the community as a whole.

The new outlying and suburban residential districts, always farther and farther out, have as a rule been planned and sold upon the quaint assumption that the railways would always, world without end, be able to carry their residents to and fro, regardless of length of ride, for a flat 5-cent fare. When I contemplate this fact, I am puzzled to account for any public hostility to electric railways, since in this respect at least the public appears to have shown more faith in the railways' ability to perform miracles than many have in the miracles of the Holy Writ.

The steadily increasing length and cost of the average street car ride, however, have broken down that ingenious assumption. The electric railways of the larger American cities have exhausted their power to perform this miracle for the profit of the developers and purchasers of outlying residential districts. War costs did not cause the breakdown; they merely hastened it a year or two.

ZONE SYSTEM IS APPARENTLY NEEDED

From one end of the country to the other agencies created by the public are engaged in readjusting oldtime street car fares to new demands upon the service. The most far-sighted of these public authorities are trying to procure the adoption of a fare basis which will not only meet the present emergency but, being flexible and equitable, will provide for future city expansion. This apparently means the gradual and general introduction of the zone system.

Habit is a hard master. The American people have the habit of paying a flat-rate fare. It is possible that they may prefer to continue paying such a fare, no matter how high the actual cost of the service may carry it. It is possible, on the other hand, that when the subject is better understood, the public will prefer a zone system—the same rule as is applied in buying steam railroad rides, gas, electricity, shirts, sugar, shoes, newspaper advertising space or anything else except street car service.

In this connection the Missouri Public Service Com-

Saving that “Extra Shovelful of Coal” by Increased Coasting

The Writer Describes the Experiences and Results Obtained by the Use of Coasting Recorders in Denver

BY HARRY C. KENDALL

Formerly Efficiency and Traffic Engineer, Denver (Col.) Tramway

THE theory that the amount of coasting obtained is a relative measure of the saving in power and brakeshoe wear that can be expected and indirectly brings about other economies in car operation is well known.

In the ELECTRIC RAILWAY JOURNAL for Jan. 29, 1916, page 215, it is stated that the Interborough Rapid Transit Company, made annual savings in fuel, water and brakeshoes through coasting as follows:

Coal and water—subway—16.8 per cent.....	\$174,000
elevated—10 4 per cent.....	67,000
Brake shoes—subway.....	36,000
elevated.....	16,000
	<hr/>
	\$293,000

On the Denver Tramway System the absence of complete records of power used for car heating and auxiliaries makes it impossible to calculate the exact saving in power effected by the use of coasting recorders, but a most conservative estimate of the annual saving in coal is more than \$15,000. The annual saving in brakeshoes averages more than \$1,500. The annual expense of the follow-up system, inspection and maintenance is about \$4,000, which leaves a net annual saving of more than \$12,500, sufficient to amortize the investment in about two years.

With the present increased cost of fuel and brake-shoes the opportunity for savings is greatly increased. It is the purpose of this article to relate some of the Tramway Company's experiences with coasting in the hope that they may be of value to other street railways.

COASTING PRODUCED QUICK RESULTS IN POWER SAVING

Coasting recorders were installed on the Denver Tramway System in December, 1912, at which time the average coasting was about 10 per cent. In 1913 the coasting per cent jumped to 28, and the total kilowatt-hours per car-mile dropped from 3.06 for 1912 to 2.88 for 1913, in spite of increased use of power for heating and auxiliaries. The cost of brakeshoes dropped from \$5.255 to \$3.880.

In 1914 the increase in coasting was only slight, namely to 29.35 per cent and, although the power used for purposes other than traction was still further increased the total power consumption was reduced to 2.89 kw.-hr. per car-mile. Brakeshoe this year cost \$3.720.

In the "spring drive" of 1915 the coasting was driven up rapidly, reaching a maximum of 42 per cent in August. The average for the year was 39 per cent and the power consumption was reduced to 2.68 kw.-hr. per car-mile. Brakeshoes cost only \$3.230 that year.

In the latter part of 1915 it was decided to make a thorough investigation of the whole matter for the purpose of convincing some of the doubters that the claims made for coasting were well founded. In the meantime the system in effect, with respect to coasting averages, was suspended. A committee of four motor-men, three of whom felt strongly that the existing basis was unsatisfactory, was appointed to investigate the coasting problem. The Railway Improvement Company co-operated heartily, sending two engineers to assist us, and we went into the question with a determination to get all the facts and to put our coasting on a basis that would command the loyal support of every trainman. Every question asked by the committee was openly investigated and frankly answered. For example, certain members of the committee questioned whether coasting percentage is a direct and reliable indication of power economy. In answering this question it was first explained that theory indicated three ways of saving power with a given equipment on a given schedule:

1. Increasing the rate of acceleration.
2. Increasing the rate of braking, particularly at the lower speeds.
3. Making fewer or shorter stops.

Further, it was claimed that if 10 per cent of power were saved in any one of these ways an increase of approximately ten points in coasting percentage would result. Consequently it appeared clear that if power were saved by any combination of the three, it would be directly reflected by coasting percentage.

To prove whether practice bore out theory, we made a number of tests on a car equipped with a watt-hour meter and coasting clocks. The tests were planned also to clear up another point. Some of the trainmen believed that the coasting recorder should be connected so that it would not stop when the brakes were applied. Consequently, the tests were arranged to prove two things: (1) That per cent coasting does give a direct indication of power economy. (2) That per cent coasting-plus-braking does not give a direct indication of power economy.

In other words, two trips, one efficient and one inefficient, were laid out as indicated in the speed-time graphs, Fig. 1 on page 52. The results of the tests are shown in Table I on page 53.

COMPREHENSIVE TEST PROGRAM LAID OUT

It will be noted that in both these tests the increase in coasting percentage is very nearly equal to the per cent decrease in power, whereas, the increase in coast-

ing-plus-braking bears no relation to the decrease in power.

These tests, together with statistics of power consumption and coasting for the system, disposed of these two mooted questions, and incidentally established some confidence in the practicality of speed-time curves and office calculations, as the results of the tests had been accurately forecasted.

COMMITTEE CONVINCED ITSELF AS TO THE VALUE OF COASTING

In this same spirit of "show me," every question raised was investigated, with the result that the members of the committee absolutely convinced themselves and made a unanimous report strongly recommending coasting as a basis of efficiency rating, pointing out remedies for the few really objectionable features in our old method of application.

An abstract of some of the most important points

There was an impression among some of the trainmen, that in order to obtain a high coasting record it is necessary to operate the car roughly. While it is true that rapid acceleration and braking, if not done carefully and skillfully, undoubtedly result in rough handling of the car, this is not necessary. Indeed, it was found that "high coasters," as a rule, operate their cars smoothly. The committee emphasized also that the conductor has it in his power greatly to increase the coasting percentage with resultant reduction in power consumption, or greatly to increase the average speed, by giving the starting signal promptly and the stop signal as early as possible.

Since high coasting means low power consumption, and since a very considerable part of the expense of maintenance of electric equipment of cars is due to the heating of the motors, it is logical to expect that an increase in coasting means a decrease in car maintenance. As a matter of fact, as shown by Table III,

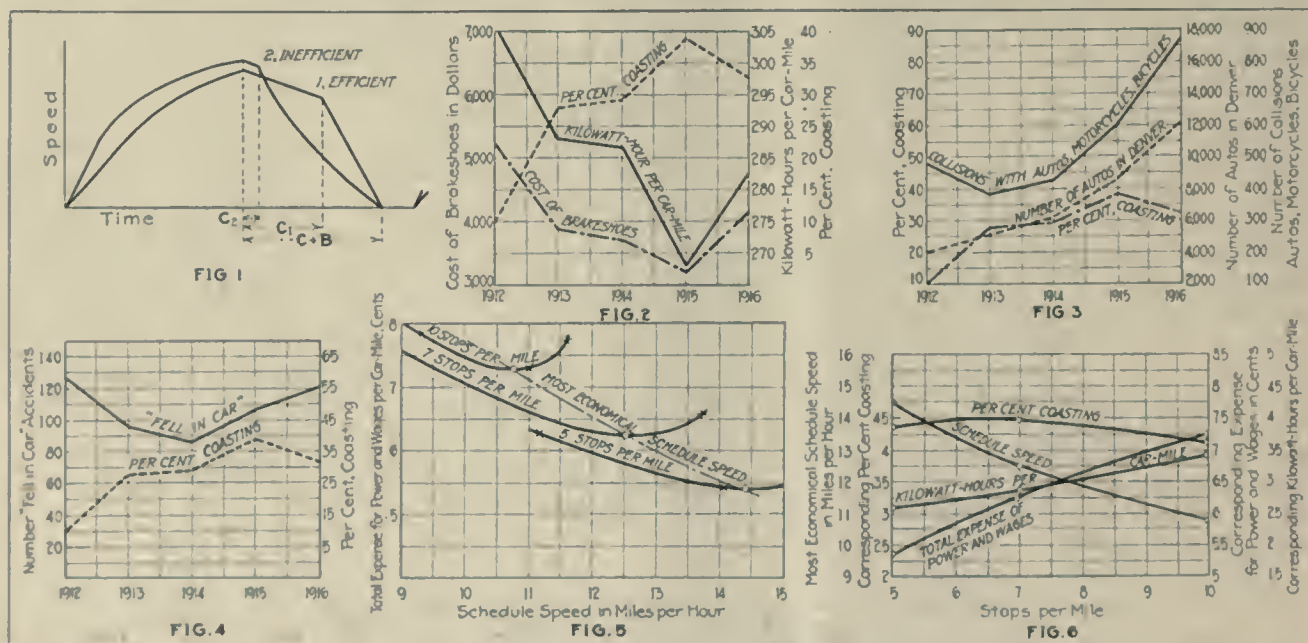


Fig. 1—Coasting-plus-braking is not a correct measure of power economy.

Fig. 2—Power consumption and cost of brakeshoes decrease as coasting increases.

Fig. 3—Relative number of collisions decreases as coasting increases.

Fig. 4—Accidents in the car bear relation to the per cent coasting.

Fig. 5—Graphical determination of most economical schedule speed.

Fig. 6—Graphs of best coasting with variation in schedule speed, power and cost.

GRAPHS SHOWING HOW INCREASED COASTING AFFECTS OPERATING RESULTS

covered by the report may be of general interest. In the first place our statistics of power consumption and of coal used for the past five years, as well as special tests which the committee made, prove conclusively that the power required to run the cars decreases almost directly as the coasting percentage increases. Table II and Fig. 2. show that the power consumption in kilowatt-hours per car-mile decreased each year that the coasting increased, and, for the year 1916, when the coasting percentage decreased 6.57 points the power increased 5.90 per cent.

A comparison for three months of 1916 with the same three months of 1915 follows:

	Per Cent Decrease in Coasting	Per Cent Increase in Power
October	11.23	13.2
November	10.59	14.4
December	10.55	11.1

the cost of maintenance of equipment during the past six years was the lowest the year that coasting was the highest.

HOW ENERGY IS SAVED IN CAR OPERATION

The committee also recommended that in approaching special work or curves the car be operated in the same general way as when approaching stops, that is, by coasting as far as practicable, then braking rapidly but releasing the brakes just before reaching the curve or special work. The coasting that saves power is coasting to stops and necessary slow-downs. Coasting down to low speed when slow-downs are unnecessary wastes time and is only possible where schedules are too slow or loads unusually light.

It appears reasonable, furthermore, that coasting should decrease collisions, as with high coasting the

maximum speed will be less and power will usually be off at street intersections or wherever there is a possibility of a collision. Accident statistics on the Denver Tramway for the past five years, as shown in Table IV and Fig. 3 indicate that the relative number of collisions decreases as coasting increases. The statistics show that in general the number of persons falling in cars has decreased as the coasting increased. See Table V and Fig. 4.

The committee felt that full value of the coasting clocks can be obtained only by publishing the records of percentages, by divisions, lines and individuals, recommending that, in publishing the individual records, some system be devised to make allowance for

In accordance with the committee's recommendations meetings were held which all trainmen were expected to attend, and these men were allowed time for this attendance. At these meetings the committee members explained in clear and convincing talks the results of their investigations. The effect was immediate; the coasting percentage being increased two points the following week. "Bogie setters" were elected as recommended by the committee, and these men have established bogies for each kind of run on every line.

A coasting instructor was also appointed for each division. These instructors are virtually captains of the division teams, among which teams there is keen rivalry. Coasting averages of the four divisions are

TABLE I—TEST RESULTS SHOWING RELATION BETWEEN PER CENT COASTING AND POWER SAVING				
	Inefficient Operation	Efficient Operation	Inefficient Operation	Efficient Operation
Running time, minutes.....	52.75	54.00	54.80	55.00
Coasting time, minutes.....	3.05	11.80	3.00	12.20
Coasting and braking time, minutes.....	18.30	22.30	21.75	21.80
Total number of stops.....	60.00	60.00	60.00	60.00
Total duration of stops, minutes	5.37	5.45	5.93	5.25
Total kilowatt-hours.....	32.70	26.6	29.70	25.50
Stops per mile.....	6.10	6.10	6.10	6.10
Average duration of stop, seconds	5.40	5.50	5.90	5.30
Average speed, miles per hour....	11.20	10.90	10.80	10.75
Per cent. coasting.....	5.80	21.80	5.50	22.20
Per cent. coasting and braking...	34.70	41.30	39.60	39.60
Increase in per cent coasting.....		16.00		16.70
Increase in per cent. coasting and braking.....		6.60		
Per cent saving in power.....		18.90		14.50

TABLE II—EFFECT OF COASTING ON POWER CONSUMPTION AND BRAKESHOE COST							
Year	Car-Miles	Kilowatt-Hours	Average Weight of Car, Tons	Kw.-hr. per Car-Mile	Coasting, Per Cent	Cost of Brakeshoes	
1912	12,247,087	37,450,220	16.72	3.06	3.06	10.00	\$5,255
1913	12,231,533	35,126,800	16.70	2.87	2.88	28.00	3,880
1914	12,112,135	34,863,037	16.79	2.88	2.87	29.35	3,720
1915	11,899,536	32,212,000	16.93	2.71	2.68	39.00	3,230
1916	12,196,217	34,946,100	16.93	2.87	2.83	32.93	4,170

TABLE III—MAINTENANCE OF EQUIPMENT, ACCOUNTS NOS. 30, 32 AND 33			
Year	Cost per Car Mile, Cents	Per Cent. Coasting	
1911	*1.09	about 10.00	
1912	*1.03	about 10.00	
1913	1.10	28.00	
1914	1.13	29.35	
1915	0.84	39.00	
1916	0.88	32.93	

*Maintenance costs low in 1911 and 1912 on account of new cars bought in 1909 and 1910, and parts of old trucks used for repairs the following two years.

the inequality of the various runs, as regards possible coasting. It also emphasized the importance of careful attention to brakes, controllers and air valves.

BOGIES ESTABLISHED BY THE MEN THEMSELVES

Finally the committee recommended that two motor-men from each division be elected by the trainmen, from a number designated by the division superintendents, to establish coasting "bogies" or standards for each run, the candidates to have the following qualifications: (1) Creditable accident record; (2) ability to maintain his schedule; (3) ability to operate efficiently and to make a good coasting record; (4) personality necessary to accomplish results in instructing others. Further it was recommended that, after the bogies have been established, one of the eight men be appointed to continue the work of modifying the bogies to meet changing conditions and to act as coasting instructor.

TABLES IVa AND IVb—EFFECT OF COASTING ON ACCIDENTS (Collisions with Automobiles, Motorcycles, Bicycles)						
Year	Coast- ing, Per Cent	No. of Collis. Auto., Bicy., Motor- cycles	No. Autos in Denver	1916		
				Coasting, Per Cent	Collisions Autos, Bicy., Motorcycles	
1912	10.00	467	4,000	January.....	36.10	61
1913	28.00	390	4,968	February.....	37.33	38
1914	29.35	436	6,120	March.....	37.28	48
1915	39.00	596	8,575	April.....	36.42	65
1916	32.93	877	12,200	May.....	35.18	55
				June.....	33.75	53
				July.....	32.02	72
				August.....	31.31	97
				September....	30.14	91
				October.....	29.92	73
				November....	29.36	107
				December....	26.35	117

TABLES Va AND Vb—EFFECT OF COASTING ON ACCIDENTS ("Fell in Car")					
Year	Coasting Per Cent.	No. Fell in Car	1916		No. Fell in Car
1912	10.00	126	January.....	36.10	10
1913	28.00	94	February.....	37.33	13
1914	29.35	87	March.....	37.28	8
1915	39.00	108	April.....	36.42	10
1916	32.93	119	May.....	35.18	12
			June.....	33.75	18
			July.....	32.02	11
			August.....	31.31	7
			September.....	30.14	11
			October.....	29.92	8
			November.....	29.36	10
			December.....	26.35	11

TABLE VI—DATA FROM SPEED-TIME CURVE Single Car (23 Tons) Level Track—10 Stops per Mile—3-Sec. Stops								
Kw.-Hr. per Stop	Kw.-Hr. per Mile	Duration of Run, Min.	Schedule Speed, M.P.H.	Wagon per Mile at 30 Cents per Hour		Cost Kw.-Hr. @ 1 Cent	Total Expense	Per Cent Coasting
				per Hour	per Mile			
0.263	2.63	38.8	9.3	6.47	1.35	7.82	62.5	
0.37	3.7	32.7	5.45	5.65	1.85	7.30	32.8	
0.52	5.2	31.	11.6	5.17	2.6	7.77	....
0.34	3.4	33.4	10.75	5.58	1.7	7.28	41.2	

shown graphically every day on a big chart at division headquarters.

We also put into effect a very complete follow-up system, through which effort is concentrated on the "low" men. Personal instruction is supplemented by special letters to the trainmen explaining the "why" and the "how" of coasting and encouraging them to greater effort. Concurrently with this work, and through the co-operation of the University of Colorado, two senior students calculated the most economical speed, per cent coasting, etc., for one of the standard motor cars, with and without trailer, on various grades and for various numbers of stops per mile.

The method of calculation was practically that described by C. C. Chappelle in the ELECTRIC RAILWAY JOURNAL of Jan. 15, 1916, and consisted in determining for what speed the cost of platform labor plus power is a minimum, under the various conditions, and then calculating the per cent coasting, etc., corresponding to

this speed. Table VI and Figs. 5 and 6, illustrate the method. Referring to Fig. 6, it will be noted that for runs of widely different length, and for which the most economical schedule speeds and power consumption vary through wide limits, the most economical coasting percentage varies but little.

The work along these lines has been well worth while. In the first place, by giving the trainmen an opportunity to convince themselves that coasting is a correct basis for efficiency rating, we secured their hearty co-operation. The result is that we are now getting a satisfactory percentage of coasting and excellent economy considering the large number of new motormen the war has obliged us to take on; and we are getting this with enthusiasm. In the second place we have convinced ourselves that while the maintenance of bogies and the theoretical calculation of the most economical speed and per cent coasting are desirable, they are by no means essential to the satisfactory operation of the coasting recorder system. The reason for this is that there is very little danger even with the present high cost of fuel, that the actual schedule speed will be too high for maximum economy, especially when we give due consideration to the intangible value of high speed. With the schedule speed set as high as can be made with safety and reliability, there is necessarily a margin of time. This margin can be wasted by inefficient operation or it can be taken up in coasting, thus giving the maximum economy. It is remarkable how uniform this margin will run on any schedule that is reasonably "tight." A "good coaster" will average 35 per cent on a run that is so fast that green men have difficulty in making the time.

The coasting recorder simply tells the motorman and the manager how this margin, which is a necessary factor in electric railway operation, is being used. How it is used makes a difference of from 10 per cent to 20 per cent in the coal bill.

Something for the Hun to Think About

THE organization of five new regiments and nineteen battalions of railway engineers, to be used in addition to the regiments already working in France, is being completed by the staff of the Director General of Military Railways, Samuel M. Felton. The work has been done in conjunction with the Engineer Corps. When the new forces are put on duty there will be 50,000 Americans engaged in railroad construction and operation in France. A total of \$160,000,000 has been spent on railway materials alone, this sum not including supplies for the Engineer Corps proper.

Early in 1917 the Chief of Engineers decided to organize a railway operating regiment. This regiment formed the nucleus of the present railway organization. While it was being formed the United States entered the war. One of the first requests transmitted to this government by the French mission was for assistance in strengthening the French railway systems to meet the increasing war train. This request was made in April, 1917, and early in May Mr. Felton was called to Washington to organize nine railway regiments.

The \$160,000,000 used for railway supplies has gone for such items as 1727 engines, 22,630 freight cars, and 359,000 tons of steel rails.

Do Not Neglect the Return Circuit

H. T. Bell at Pacific Railway Club Meeting Said That More Attention Should Be Paid to the Track Return in the Interest of Economy

AT THE "Electric Railway Night" meeting of the Pacific Railway Club held on June 13 Herbert T. Bell, electrical engineer San Francisco-Oakland Terminal Railways, put in a powerful plea for more careful design and maintenance of the return circuit, pointing out that it is illogical to concentrate attention on the overhead altogether and neglect the return circuit.

Mr. Bell devoted his paper largely to a discussion of types of bonds and methods of installing and maintaining them. Among other good things he said that no bond can have an appreciable life on a mechanically poor rail joint. The details are to be settled as a compromise of conflicting requirements. For example, on comparatively poor joints, the conductor joining the terminals should be long and flexible. From an electrical standpoint, as well as an economic one, the conductor should be as short as possible. With respect to corrosion, the conductor should be a circular solid piece of a non-corrosive metal (which is not flexible but presents the least area to corrosion). In its electrical characteristics the metal should have a low coefficient of resistance, while from the economic standpoint it should be inexpensive.

Mr. Bell mentioned some general precautions and practices in connection with plug terminal bonds. In installing these only accurately ground drills should be used, and these should be entered at right angles to the rail web and should produce a smooth finish in the hole. Where rails are furnished with the bond holes punched or drilled, these holes should be small enough so that they can be reamed, thus exposing entirely clean metal when the hole is of its proper size. The bonds must not be installed in other than freshly drilled or reamed holes, and no oil should be used in drilling because oil is an insulator. A solution of salt and water is a good lubricant for drilling. Tinning, soldering or amalgamating the contact surfaces improves the union and decreases the contact resistance by an average of from 15 to 18 per cent. When terminals are compressed, care should be taken to see that the compressor is applied at the center of the stud and that its axis is at right angles to the web of the rail. Where bonds are applied under rail joint plates, care in installing them may produce big savings either in preventing the losses which follow the use of poor bonds or in saving the expense of removing and replacing paving, spikes, bolts, and angle bars for the purpose of renewing bonds. The resistance of a well-bonded joint should not exceed 0.0001 ohm.

In conclusion, Mr. Bell said: "The grounded side of the distribution system must be designed and maintained with the same care, using the power house as the apex, as is the insulated portion of that same distribution, to gain the most efficient and economical results."

The United States Fuel Administration has inaugurated a plan to reduce waste of coal in power plants by appointing a number of district representatives who will make surveys of the power situation in their respective territories. The aim is to save 20,000,000 tons of coal by eliminating wasteful practices.

Electric Carriers Answer the Call

San Francisco Company Loads Ship Workers with Amazing Speed—Charleston Line Is Expending \$300,000 to Aid the Government—Houston Railway Is Carrying Aviators and Others

THE ways in which electric railways are serving the nation are many, in spite of the handicaps imposed by limited resources and a decreasing earning power. This journal has in preceding issues [June 1 and June 22] described the war work being carried on in Atlantic Coast and Southern cities, and this week it is adding the following series of articles to show the railway activities in government service at various other points.

Charleston Is Spending \$300,000

Sixteen Center-Entrance Multiple-Unit Type Cars Ordered for Navy Yard Service—Double Track Installed, and Automatic Substations Completed

CHARLESTON, S. C., is a city whose population has increased considerably since the opening of the war. The Navy Yard personnel has grown from 1500 to 4500. A cantonment for training sailors from 3500 to 6000 at a time has been erected. Congress has authorized a base hospital and another drydock, while the lumber mills, fertilizer works and other industries are now employing more than 5000 people.

cars. It was recognized, however, that the use of old cars singly or in pairs, particularly for the heavy service to the Navy Yard, could only be considered as temporary.

During the last two years the company had made an important improvement in track capacity by adding a 60-lb. T-rail second track $1\frac{1}{2}$ miles long between State Road-Clement's Ferry and the Navy Yard terminal. This made it possible to consider the operation of high-speed trains, the main item covered by the company's appropriation for betterments.

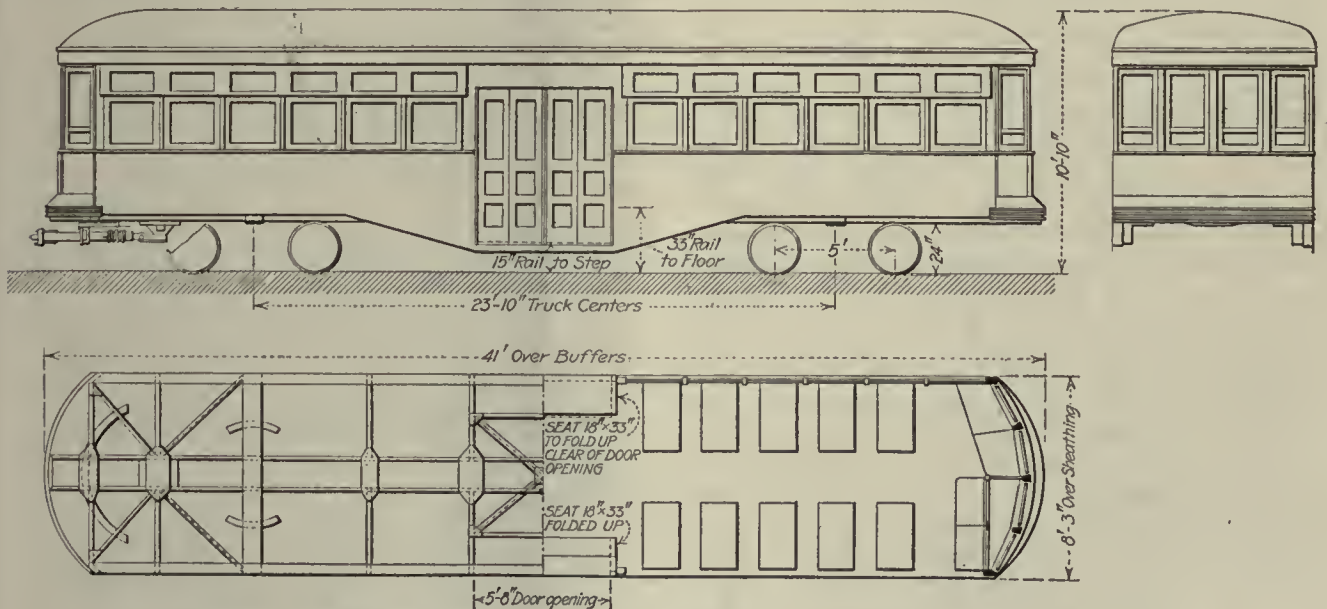
This appropriation, amounting to \$300,000, includes the following:

Sixteen double-track center-entrance cars with multiple-unit control to be run to the Navy Yard in trains of as many as four cars.

Ten one-man safety cars for city service.

Seven-track twenty-one-car storage shed (180 ft. x 70 ft.) of slow-burning wood to be constructed adjacent to the present carhouse. This will also contain the carpentry shop, the paint shop, the storeroom, the dressing room for shopmen and the master mechanic's office.

An automatic substation located $1\frac{1}{2}$ miles from the Navy Yard. It has a General Electric 500-kw. 60-cycle, 900-r.p.m. rotary converter, outdoor transformers, Condit time-limit relay, Bristol graphic recorder and Weston ammeter. This substation was opened on May 11.



CHARLESTON CENTER-ENTRANCE CAR; SIDE ELEVATIONS, PLANS AND BOTTOM FRAMING

In sum, it is estimated that from 25,000 to 30,000 people have been added to Charleston's population.

When the first accessions began a year ago, the company met them by purchasing six second-hand cars. During the last winter it also leased one motor and five trail cars from the Charleston-Isle of Palms Company, but as these had to be returned in May their place was taken by the company's own ten-bench open

At present cars are run past the two gateways of the Navy Yard, and passengers pay their fares after boarding. About 4000 to 5000 people are handled in one hour, the biggest single load being the release of 700 white women at 6.35 p.m. and 700 men at 6.45 p.m. The employees begin to leave work at 4.15 p.m., and stop at 7.10 p.m. Separate cars are furnished for all white women except stragglers; also for white and

for colored men as far as practicable. The cars are loaded heavily, and the passengers take all kinds of chances in their hurry to get away. The women on their cars are not much better than the men, although they do not climb to the roofs or stand on the bumpers.

If the company can secure permission to use some government ground at the main or upper gate for a prepayment area, loading conditions and fare collection will be greatly improved. Then the addition of the train service with air-operated car doors will produce absolutely safe boarding, riding and alighting conditions.

Train operation with one prepayment area for all Navy Yard passengers will also relieve the company's acute shortage of platform personnel. At this time twenty-five to thirty office and shop employees are used to help out in the morning, and half that number in the evening. This is especially hard on the car maintenance department, because the men do not return until 8.30 or 9 a. m. This loss of time is of genuine concern in these days.

That there is more patriotism than profit in this service may be judged from the fact that for 5 cents one may ride the 7 miles from the Navy Yard to the Battery (the downtown tip of Charleston) during the peak hours, 6 a.m. to 8.30 a.m. and 4 p.m. to 6.30 p.m. The normal 5 cent ride is between North Charleston and the Navy Yard, 2 miles. The inadequate 5-cent fare to the Navy Yard is a relic of the days when special inducements had to be offered to the government to induce it to continue such a yard in Charleston!

HOW CHARLESTON WILL GET MODERN TRAIN SERVICE

In addition to equipping six of its present steel vestibuled cars with Westinghouse HLD control for train operation, the company expects to receive after Aug. 1 six center-entrance motor cars and ten trailers, now being built by the Cincinnati Car Company. These are to be operated for Navy Yard and other heavy services in groups of as many as four cars. Progress in the art of car building and equipment manufacture is indicated by the fact that these fifty-three passenger cars will weigh but 35,000 lb., although they will carry four motors, multiple-unit control and draft rigging. The best car in use in Charleston to-day, seating only forty-one passengers, weighs 36,000 lb., although it has only two motors and type K control. The new cars will weigh 660 lb. per passenger; the preceding cars purchased weigh 878 lb. per passenger.

Center-entrance operation with pneumatic door engines and interlocking control was favored to secure maximum seating capacity and to prevent reckless jumping from cars—even by women. The steps are also completely inclosed. The distance from the pavement to the first step is 15 in., and above this step are two 9-in. risers. No ramps are used, and the elimination of these is expected to make floor maintenance easier.

All of these new cars will be 41 ft. over all, 37 ft. over the body corner posts, 8 ft. 3 in. wide over the sheathing, 10 ft. 10 in. high from rail to top of roof. The seats will be 35 in. wide; aisle, 23 in. wide; the distance between truck centers, 23 ft. 10 in.; the truck wheelbase, 5 ft.; the wheel diameter, 24 in. The radius

on the inner rail of the shortest curve on which these cars will run is 35 ft.

The underframe is of angle side-sills, channel center-sills, channel diagonals, buffer bands reinforced with Rico anti-climbers, body bolsters of trussed girder type with 1-in. x 9 in. top and bottom plates and gray iron fillers. The body framing has all side posts formed of T-bars extending from side sill to side sill. The door framing for the center-entrance is formed of steel angles in one continuous piece from sill and over the door opening. The sides below the window sills are of No. 12 gage sheet steel in one width from side sill to window sill, being pressed on the top to form the belt rail and window sill. The letterboard is also of No. 12 gage sheet steel. The vestibules are sheathed on the outside below the windows with No. 16 sheet steel in three sections, so made that they can be removed without disturbing vestibules or posts. The posts are ash. No doors are used, the motorman being able to do any necessary switching by leaning out of the vestibule.

The arch roof is covered with poplar board and painted canvas. The interior finish is mahogany. The wainscoting from window sill to seat angle is $\frac{3}{4}$ -in. Agasote with a $\frac{3}{4}$ -in. air space between the Agasote and the steel side sheathing. The finish below the seat angles is formed of pressed sheet iron to avoid a dirt pocket at the floor.

The equipment schedule for the new cars covers the following:

<i>Curtains</i> —Pantasote with Curtain Supply Company's ring fixtures and Rex all-metal rollers.	<i>Couplers</i> —Tomlinson Type A, Form 8.
<i>Destination signs</i> —Keystone.	<i>Air Brakes</i> —Westinghouse AMM, complete on motor cars; in part on trailers.
<i>Seats</i> —Hale & Kilburn, No. 300 A.	<i>Governor synchronizer system</i> —Westinghouse.
<i>Motorman's portable folding seat</i> —Keystone.	<i>Signal system</i> —Westinghouse No. 8-T, electro-pneumatic.
<i>Door engines</i> —National Pneumatic to control four-leaf folding doors arranged to swing outward. Doors on motorman's right-hand side may also be operated by him.	<i>Motors</i> —Westinghouse No. 514.
<i>Registers</i> —International, H5.	<i>Control</i> —Westinghouse HLD.
<i>Buzzers</i> —Faraday, Keystone.	<i>Trolley bases</i> —Ohio Brass Form 1.
<i>Gongs</i> —Dedenda.	<i>Lighting</i> —One circuit of 94-watt Mazdas for body, and one circuit of 23-watt Mazdas for other purposes. Light wiring run in Duraduct with Flex shadeholders at all outlets for lights. Alba reflectors used on center lights.
<i>Sanders</i> —O-B sand traps and National Type C sander valves.	<i>Trolley retrievers</i> —O-B No. 11973.
<i>Headlights</i> —Crouse-Hinds SDF 12.	<i>Trucks</i> —Brill No. 77 Cincinnati.
<i>Ventilators</i> —Automatic type ARDM, eight on each side of roof.	<i>Journal boxes</i> —Symington.
	<i>Motorman's mirrors</i> —Drew.

FIRST SAFETY CARS ALSO DUE IN AUGUST

The company has also ordered from the same car-builder ten Birney-type double-end one-man cars equipped with the combination of the Safety Car Devices Company. The first five, expected in August, are to go on the Broad Street crosstown line, and the second five on the King Street line, which serves the heart of the city. These cars, therefore, are relied upon to do real work. As they weigh but 13,000 lb. compared with 27,000 lb. for present cars of the same capacity (thirty-two passengers), Fuel Administrator Garfield may well be thankful.

Perhaps the chief variation of this car from the Stone & Webster Birney type is that for the same over-all length of 27 ft. 9 $\frac{1}{4}$ in. the platforms are 3 in. shorter because wider corner posts are used to get increased stiffness. The wheel housing has been elimi-

nated by raising the body 1½ in. The vestibule doors are hinged to the body corner post instead of the vestibule post, thereby preventing the exit of passengers until the door is fully open and the step down.

The car underframe is of steel angles, the body framing being like that of the center-entrance cars above described. The roof is of wood, and the ceiling of ⅜-in. Nevasplit headlining. The principal equipment of the new safety cars may be summarized as follows:

Curtains—Pantasote.
Ventilators—Utility (eight).
Trucks—Cincinnati.
Hand brakes—Pittsburgh drop handle.
Heaters—Six Consolidated cross-seat type, with thermostatic control and Duraduct fittings.
Push-buttons—Faraday, Keystone.
Signs—Keystone.

Gongs—Dedenda.
Trolley catcher—Ideal.
Air brakes—Westinghouse.
Operating devices—Safety Car Devices Company, including National Pneumatic door engines.
Motors—Two Westinghouse 506 A-2, with sleeve bearings.
Control—K 10.
Headlights—Golden Glow.

It may be added that there will be only two five-light circuits, the body-lighting circuit consisting of 56-watt units and the other of 23-watt units.

Moving 8300 Shipbuilders in Fifteen Minutes

United Railroads of San Francisco, Through Ample Car Storage and Front-End Collection, Make Quick Work of Heavy Rush Traffic

THE famous Union Iron Works of San Francisco represents the greatest war industry of that city. The works has been accessible for years by means of the old lines of the United Railroads, but with the recent increase of shipbuilders to 8300 or more it was deemed desirable to get the men to and from their homes by shorter, non-transfer routes.

Therefore the railway of its own volition arranged to pay for the construction of a 1-mile line on Army Street to connect with the existing lines over Twentieth Street about ½ mile from the main gates of the Union



FRONT-END FARE COLLECTORS OF THE UNITED RAILROADS DASHING TO THE NEXT CARS FOR SHIPBUILDERS

Iron Works. At this writing only one track has been completed, but the cars are fed to the loading district in such a way that this track can be devoted exclusively to handling all rush traffic bound in one direction. The empties are sent back by routes which are more roundabout.

The works are located on the bay in South San Francisco, and most of the men live in Daly City, the Mission District and other southwestern sections. Through the Army Street line the great mass of riders enjoy direct service and a saving in time of twenty minutes each way.

Shortly before the main closing time, 4.40 p.m., about seventy-five cars are in line on both tracks at Twentieth Street and moving toward Third Street, which, curiously enough, is at right angles to Twentieth Street. At this intersection from twelve to fifteen front-end fare collectors are spread along to assist in speeding up the loading. As these men are experienced conductors (who have already completed their daily platform stint), they



THE FLOOD GATES ARE OPENED AND SAN FRANCISCO'S SHIPBUILDERS POUR FORTH

are very helpful in directing the traffic. The cars are loaded with such amazing speed that from seventy-five to ninety cars are disposed of in from fifteen to twenty minutes.

As at so many shipyards, a rough element is included among the workers. Some of them try to jump through the car windows, and plenty of them endeavor to ride on the fenders, simply to escape paying a 5-cent fare. Often, too, the platforms are packed, with scarcely a standee inside. This is particularly true on warm evenings in the case of the California-type car in which there is a closed section with bulkheads, doors and longitudinal seats in the center. In short, the service is ample, but it is not used by the passengers to full advantage. Jitney competition is not a factor in the case, as the jitney fare is 10 cents.

Negotiations are now under way with the Emergency Fleet Corporation and the Union Iron Works for the construction of a sheltered prepayment area. This would enable the railway to handle the service more efficiently and would be a boon to the workmen in bad weather. The subject of staggering the hours at this plant is also under consideration.

The Union Iron Works is building another plant at Hunter's Point, several miles south and $3\frac{1}{2}$ miles from existing electric railway routes. Without financial aid, however, the United Railroads could hardly undertake to build such a line for only 4000 to 5000 men traveling one round trip a day. The matter of providing electric railway service for the workers at this new plant is now under negotiation.

Carrying the Boys at Houston

6900-Ft. Extension to Camp Logan—Siding Station at Ellington Field—Aviation Traffic
• \$10,000 Monthly

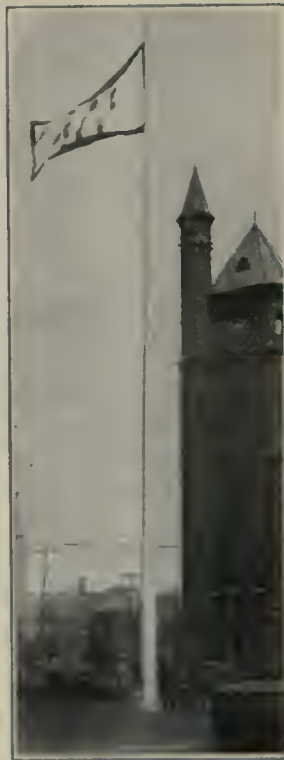
IN ORDER to give service to Camp Logan the Houston (Tex.) Electric Company last year extended its West End line by 6900 ft. of single track and built a prepayment area with ordinary ticket boxes. This work cost about \$60,000 and for a most uncertain traffic. In the first place, the number of soldiers has varied from 35,000 to 4000; in the second place, many soldiers prefer automobile parties when going to town. The increase in electric railway service, therefore, has varied in accordance with the fluctuations in traffic to be handled by the company.

A somewhat better traffic proposition is afforded by the aviation ground known as Ellington Field. This is located within 17 miles of Houston and about a mile from the Galveston-Houston interurban line. To serve this field the company built a siding and station at a cost of about \$17,000.

The aviators, particularly the cadets, have money to spend and are good riders. Many of the men go to Galveston for the week end. Bad weather increases travel, as then the aviators are idle. The monthly increase in gross earnings for passenger traffic at Ellington Field is about \$10,000, in addition to from \$1,200 to \$1,500 for supplying light and power. The additional railway service is provided by increasing the length of trains without change in the usual hourly headway.

While there is some shipbuilding going on along the Houston Channel at Harrisburg, 5 miles from Houston, it has no direct influence on electric railway travel. There are two plants—the Universal Shipbuilding Company and the Midland Bridge Company—building 3500-ton vessels for the Emergency Fleet Corporation. The Universal has a contract for twelve ships and the Midland one for six, totaling \$4,400,000. There are probably less than 3000 employees, and these travel by steam train or automobile. Travel by boat is also possible, but it is too slow.

A Graceful Gift



GEORGE H. CLIFFORD, vice-president and local manager Northern Texas Traction Company, is one of Fort Worth's most public-spirited citizens. As one pictorial proof note the beautiful 75-ft. Western red-cedar pole which his company donated to fly Fort Worth's honor flag for going over the top with the Third Liberty Loan.

The pole has been erected in front of the Texas & Pacific Railway passenger station, so that both the native and the stranger are not left in doubt as to where Fort Worth stands. Looking at this handsome pole, one may say with truth that it was a graceful gift in a double sense.

An earlier similar gift proposed by Mr. Clifford was a 70-ft. pole which now floats the flag of staff headquarters at Camp Bowie, located not 3 miles from the center of Fort Worth.

Houston War Gardens Win Prizes

TO ENCOURAGE the cultivation of war gardens the Houston (Tex.) Electric Company in February sent a letter to its men asking them to signify by the end of March whether they would care to compete for war garden prizes consisting of one award at \$25, three at \$15 and ten at \$5. Ninety-two of the company's employees entered the competition.

Inspection of the gardens, which began on May 10, required almost four days of the judges' time. The principal points considered were the character of the soil, the care shown in handling the garden, and the ability to diversify and rotate the crops. The winner of the first prize secured particularly good results with beans and potatoes. Of the latter he raised nearly twenty bushels.

Besides taking part in the official competition, the men showed their interest by bringing down specimens of their farm craft to the clubrooms for comparisons of size and quality.

What Is a Fair Return in War Time?

Increase in Rate of Return Is Not Justifiable Because of Decline in Purchasing Power of Money, But Commissions Should Preserve Old Fair Returns—Rate on New Investment Must Be Based on Market Conditions—The Different Rates Can Be Easily Handled

By JOHN BAUER
Princeton University

OPERATING costs of public utilities have increased tremendously during the war, so that extensive revision of rates has become necessary. In many cases where before the war the margin of earnings above a fair return was narrow, increases have already been granted by the public service commissions. Many other companies are only beginning now to feel the keen pressure of mounting costs and to seek relief. Commissions all over the country will be flooded this year with petitions for higher rates, and extensive advances will have to be allowed.

In every case for increased rates, the question of a fair return on investment will have to be considered. What, during the war, is a fair return? What special adjustments, if any, should be made because of the war? This question has been answered in two extreme ways: (1) That inadequate returns on investment, especially to stockholders, should not be made the occasion for rate advances; and (2) that the return should be increased in proportion to the change in general prices, to compensate the security holders for loss in purchasing power of money received as interest or dividends.

Ideally, public utility investments should be regarded in the nature of loans to the public, and as such should have a fixed return whatever the change in operating conditions. Unfortunately, however, their status has not become clearly defined, so that even before the present emergency both the basis and the rate of return were uncertain quantities, subject to reasonable decision in each case. This indefinite situation continues, and each case will have to be treated under the broad rule of reasonableness.

QUESTION OF A FAIR RETURN IS DIFFICULT

But what is a reasonable return? This question was a baffling one before the war and is particularly so now. Neither of the foregoing views seems satisfactory. A return cannot fairly be shut off even on stock investment; nor can it well be adjusted to the shifting purchasing power of money.

The first view would be short-sighted indeed, especially if we continued to call on private capital for new investment. Many improvements must be made during the war, in many instances because of the war. Then how can the funds be obtained if a sufficient return is not allowed for the purpose? This, of course, is in addition to the general point that in any event past investment for public service should be treated justly. While the consumers should be protected, the security holders are also bearing the increased cost of living, war taxes, etc.,

and should receive due consideration from the public service commissions.

The second view, however, that the return should be adjusted to the changing purchasing power of money, seems altogether unreasonable. Just why should the adjustment be made? It is true, of course, that the rising prices have reduced the real income of the security holders, even if the same returns in terms of dollars are obtained. But the bondholders in all industries have fixed money incomes and have had the same shrinkage in real income as the public utility bondholders—yet there has been no thought of changing the general interest contract. Suppose that the suggested adjustment were made; would the bondholders of the public utilities share in the benefit? If not, then why should the stockholders be treated differently? It is true that they bear more risk than the bondholders; but they are nevertheless protected in their income, besides being shielded from the competition of other companies or individuals. Since any change in the rate would go only to the benefit of the stockholders, would it be reasonable to make any adjustments?

STANDARDS OF FAIRNESS TO BE FOLLOWED

Is it not the sensible view that the investors shall be treated according to the same general standards as before the war, receiving a fair return on the fair value of the property, with the standards of fairness practically unchanged? They would then get the same money return but would sacrifice considerable real income because of the decline in the purchasing power of money. They would thus incur a sufficiently high burden due to the war. No other penalty should reasonably be imposed, but no ground for relief can be urged. The following special points, however, should receive consideration:

1. The general basis of valuation should not be changed from the standards before the war. The unit prices used in an appraisal certainly should not reflect the present abnormal conditions. While new investment will have to be made at present high prices, that can be specially provided for by adding the actual new cost to the rate base.

2. On new investment, the rate of return allowed must be based on market conditions. If additions must be made, and if new capital will cost 8 per cent or more, the rate must be paid and the consumers must bear the cost. But this high rate should not be applied to old investment, made when interest rates were lower and the requirements of the investors were less.

3. A distinction should be made between companies that have been making excessive returns in recent years and those that have been operating on a narrow margin or have not been making a fair return. In the latter cases adjustment in rates to meet increasing costs should be promptly made. But in cases where there have been surplus earnings, there is less reason why immediate rate increases should be allowed, even if a full return on investment is not being earned. The companies are entitled only to a fair average return from year to year. The failure to make a full return in one year does not justify immediate increases in rates. If, say, during the last five years a company has made more than 8 per cent on the investment, there would be good reason for postponing any rate increases even if considerably less than a fair return is earned under present conditions. There would be a sufficient margin in the past earnings to justify a wait for developments during the uncertain present circumstances.

4. When rate increases are allowed because of emergency, the facts should be clearly set forth, and due caution should be given that when conditions again permit, a reduction in rates will be ordered. Commissions ought to keep unusually close track of operating and financial conditions; they should be ready to permit increases in rates promptly if they are needed, but they should be equally prepared to order reductions when they are again fairly justified.

DIFFERENT RATES ON OLD AND NEW INVESTMENTS WILL DO NO HARM

The second point made above raises the question as to whether or not it is injurious to have different rates of return for old and new investments. Would the credit of the company suffer from the rate of return on the old investment not being increased to meet the higher rate now prevailing for new capital? One of the chief factors in the size of the rate of return is the certainty of the return. The greater the risk, the higher the rate of return; the lower the risk, the less the rate of return. Certainty means that the contemplated return will actually be paid. If the entire prior investment obtains the return that was contemplated or fairly expected as the successive security issues were made, all the contracts, actual or implied, will have been kept, and the company's credit to that extent is good. With a new issue of securities the chief consideration is that the promised or reasonably implied interest will be paid. If there is practical certainty that it will be paid, the company can get capital funds at rates representing good credit, even though the rate of return on past or existing investment is much less than must be paid for the new capital.

Another pertinent question is this—is it practicable for a utility to have different rates of return on its old and new investments? If the property has been previously appraised for rate purposes, so that the past investment entitled to a return is established, the payment of a higher rate of return on the new investment can be easily managed. If bonds are issued, they will have to be sold at a discount, and the amortization of the discount during the life of the bonds should be included in the return. The bondholders will get the high return which they now expect, if they receive, say, 5 per cent

on the par value of the bonds purchased at a discount, and the company will be able to meet its obligations if it receives in its return the 5 per cent interest and the amortization of the discount. In other words, these requirements for the new investment are simply added to the return required on the previously existing investment.

The matter is more difficult to handle if funds are raised through the issuance of capital stock, because this cannot be sold below par unless special legal provisions have been made. But the bulk of recent public utility investments has been made through bonds, and this is probably the most satisfactory method of financing semi-public securities and should be used under the circumstances here discussed. The actually necessary interest burden for new capital would then be placed upon the public, and a fair return according to former conditions would be paid on the previous investment.

If the past investment has not been determined and the fair return is uncertain, then the problem of maintaining credit is a more difficult one, unless the proposed issues can be given preferential rights over existing securities and their return be practically guaranteed. If the new issues simply take equal place with their kind of previously existing capitalization, it is possible that the contemplated return may not be obtained. Then, before the company can increase its rates to maintain its return on investment, a valuation must be made to determine a fair return; otherwise, only such rate increases can be allowed as are obviously necessary to prevent insolvency.

Each case of uncertain past investment, however, must be handled according to its own facts. In most instances, perhaps, although the total investment may be indefinite, the bonds outstanding are clearly well under the fair value of the property, so that the new bonds may be issued with practical assurance of interest payment. In such cases, fixed charges can be maintained through rate increases without a valuation of the property. But there are many cases where the bonds outstanding do not represent fair investment, or at least where there is uncertainty. Then the only way good credit can be established is to determine first the existing investment so that the necessary return can be ascertained. After that the interest on new securities can be easily managed.

RATE INCREASES MUST BE BASED ON FACTS

But all this leads to a question slightly touched upon before the proper valuation procedure in war time. No difficulty arises in this connection if the company has been under fairly active commission control. In such a case the investment has probably been definitely fixed as of some past date, so that the problem of determining a fair return is merely to add the property installed since the appraisal and subtract the withdrawals. This work and a statistical analysis of the financial facts with a moderately competent force would not require more than two or three weeks for the establishment of fair rates.

Expedition is difficult, however, if the company's property has not been previously appraised, and unfortunately, the country over, such companies probably predominate. Every public service property, subject to rate control, should have been appraised some time dur-

ing the last ten or fifteen years and the investment entitled to a return definitely fixed. Then rate control would have been practically an automatic matter, subject merely to accounting supervision. Yet no systematic policy has been carried out, and the utilities are in a state of indefiniteness for which they have a large share of responsibility. When now they ask for increases, therefore, they should not expect the commissions to proceed without facts. Even with maximum expedition, facts must be considered.

There are, of course, cases where advances can properly be allowed without direct reference to valuation. If a company is not making operating expenses, then ordinarily relief may be safely granted to the extent of the deficiency. Usually, also, if a company is not making interest, rentals and other fixed charges, and is in danger of insolvency, rate advances should be allowed. But even in these cases there must be some regard for valuation. For example, the returns that have been made in recent years must be examined, which involves valuation. The question arises whether large charges have been and are being made for amortization and other reserves, which might be safely discontinued for a time or whose funds might be used to meet fixed charges; but the reasonableness of such adjustments would depend upon the returns earned and therefore involves valuation. Moreover, fixed charges have no necessary validity for rate purposes. They may represent interest on overcapitalization in bonds issued in heedless consolidations, or rent payments on contracts that can find no support in a rational public policy; these questions involve valuation.

It seems, therefore, that an unappraised property must be content with such adjustments as are obviously necessary, or go through a formal rate procedure to determine the investment and the reasonable return. If it tries to maintain its pre-war income, it seeks to assume the reasonableness of that income, and the commission simply cannot accept such assumption without a fairly definite basis or judgment, which means valuation. Of course, the obviously necessary increases may be allowed, and the more equitable determination may be deferred until the essential facts have been ascertained.

The extent of the delay in securing a formal valuation and its expenses will depend largely upon the attitude of the companies. If they are willing to adopt a reasonable basis of valuation and use short-cut methods of appraisal, they will obtain substantial justice at moderate expenditure of time and money. If, however, they fight for the highest possible valuation, insist on reproduction cost at war prices, dispute the rational treatment of depreciation, claim unjustifiable overhead charges and absurd going value, and make inventories with pinpoint minuteness, they will naturally roll up huge expenses and cause intolerable delay in time—all to no clear advantage to themselves.

Much talk is going on about emergency increases for the period of the war. There should be no mistake about this matter. If rate increases are necessary now because of high costs, they will continue to be so for the same reason. Not only will there be no decrease in costs during the war, but there will probably be further increases, and high costs will remain indefinitely after the war. If this view is correct, there is all the more reason, except for real emergency cases to avoid in-

solveny, why the fundamental factors controlling a rate proceeding should be adequately regarded even at the present critical time.

In general, therefore, the only satisfactory way out of the difficulty is for the commissions to grant emergency relief where clearly necessary, and then proceed with quick appraisals of the properties, following a reasonable general basis of valuation and using rational short cuts in the inventories and the computations. Without obstructionist tactics and with both the commissions and the companies eager to have the work completed, the work of valuing the utilities can be greatly expedited.

British Relief Recommended

Committee of House of Commons Favors Temporary Modification of Statutory Limitations on Rates

The select committee, recently appointed by the House of Commons, to consider the temporary modification of statutory requirements with regard to British tramway fares has issued a report recommending such relief. Previous reference to this committee was made in the issue of the *ELECTRIC RAILWAY JOURNAL* for June 1, page 1057.

Evidence tendered by the Tramways & Light Railways Association and the Municipal Tramways Association showed that all tramway and light railway undertakings are injuriously affected by increased working expenses due to the war, wages having risen from 60 to 100 per cent and cost of materials from 100 to 200 per cent. In addition, the increased cost of fuel, and, consequently, of power, coupled with restrictions imposed on supply, should be taken into consideration.

According to the committee's report, the larger revenue earned by many tramways does not compensate for the constantly advancing costs of operation, although in most of the large towns, where the tramway systems are generally owned by the municipalities, there is still a margin, since the fares charged are in most cases lower than the statutory maximum. Some possibility of relief, the committee feels, should be afforded to those undertakings which cannot increase their revenue. Although in the case of municipalities deficits can be made good out of the rates, the passenger should not be carried at a loss.

The committee therefore recommends that the Board of Trade should be empowered by general legislation to permit the temporary modification of statutory rate requirements in the case of undertakings whose financial circumstances are proved to the satisfaction of the board to have been injuriously affected by causes arising out of the war, the word "temporary" covering a period limited to the duration of the war and two years after its termination.

Because of narrow streets and increased danger from automobiles sweeping conductors off of running boards, the Portland (Ore.) Railway, Light & Power Company has cut an aisle through fifty-seven open cars to be used only to facilitate safer fare collection by the company.

Seven-Cent Minimum Fare Allowed

Middlesex & Boston Unit Increase Intended for
Quick Relief—Commission Suggests Change
Later to Encourage Short-Haul Rider

AN INCREASE in fare to 7 cents has just been allowed to one of the pioneer 6-cent electric railway lines in the country, namely to the Middlesex & Boston Street Railway, Newtonville, Mass., by the Massachusetts Public Service Commission. In sanctioning the 7-cent minimum rate the commission says it is far from convinced that the tariff plan is superior to the zone method adhered to by many of the other large companies of the State. The board feels that the institution of a higher minimum rate may discourage short-haul travel, but it will give the company a chance to show what the flat increase may effect in additional revenue.

The commission believes that the company should be permitted:

1. To make the unit fare 7 cents on all lines where it is now 6 cents, which will give the company a substantial increase in rate where the traffic is heaviest.
2. To abolish the present tickets, sold at the rate of twenty for \$1.20 on most of the lines where the cash fare is 7 cents.
3. To charge 1 cent additional in transferring from a line with a 7-cent fare to one with an 8-cent fare.
4. To continue the present 8-cent rate on the unprofitable lines where it is now charged.

The Middlesex & Boston Street Railway differs from nearly all the other larger companies as to the best method of raising fares. The general view in Massachusetts seems to be that it is desirable to try to hold short-haul business by keeping the minimum fare relatively low. The Middlesex & Boston company strongly adheres to the principal of a progressive marking-up of fare units, regardless of the effect on short-haul traffic. In commenting upon this situation the commission says in part:

"In the Bay State rate case, it was held that the company must satisfy the commission that there is at least a reasonable prospect that the change in fares desired will result in an increase in revenue. There is great practical difficulty, however, in applying this rule. Where a need for additional revenue has been demonstrated, the commission would not be justified in refusing to allow a company to adopt a certain method of securing this revenue merely because of a difference of opinion in regard to the probable results. There must be evidence sufficiently clear to convince reasonable men that the method ought in both the company's and the public's interest to be set aside.

"Up to the present time, unfortunately, the evidence in regard to the effect of increases in fares is not entirely clear. While the experience of practically all the companies which have raised rates has been disappointing, general conditions have been so abnormal that it is difficult to draw positive conclusions. In several cases companies have gained very little apparent benefit from the increase, but in every such instance they have been strong in the belief that results would have been worse if the increase had not been made. The falling off in traffic has been ascribed only in part to the higher fares, and such factors as increased use of automobiles,

weather conditions, the departure of young men for war service and the thrift campaign are also held responsible. In the present instance these other factors have, without doubt, played a large part in the poor showing of the last eight months, and this is especially true of the unusually severe winter weather in January, February and March. The Boston & Worcester Street Railway, which operates in part through the same territory and has a mileage zone system with a minimum fare of 6 cents, has made no better showing than the Middlesex & Boston Street Railway.

"The commission is inclined to the opinion that the proposed fares do not represent a well-considered plan for the raising of additional revenue. At the same time, the commission is satisfied that there is at least a reasonable prospect that this schedule, taken as a whole, will result in some increase in revenue and it cannot, therefore, be disallowed in its entirety.

"We are not satisfied that the 1-cent transfer charge ought in all cases to be permitted. In transferring from a line with a lower to one with a higher fare such a charge is reasonable, but where the lines are of similar character and the rate is the same there seems no adequate justification for requiring a passenger to submit to the inconvenience of changing cars and pay an extra charge as well. In cities which have a clearly marked traffic center, it may be a fair assumption that most passengers who transfer at this point secure in this way a ride longer than the average, but no evidence was offered that this is the case with the transfer passengers of the Middlesex & Boston Street Railway.

"The demands of labor have made the situation critical and the company needs quick relief. It would not be wise or fair, under present conditions, to delay this relief until the study of traffic conditions could be made which would be necessary to determine whether or not it is possible to devise a system of fares better adapted than the one now proposed to hold the short-haul rider and encourage the movement of traffic."

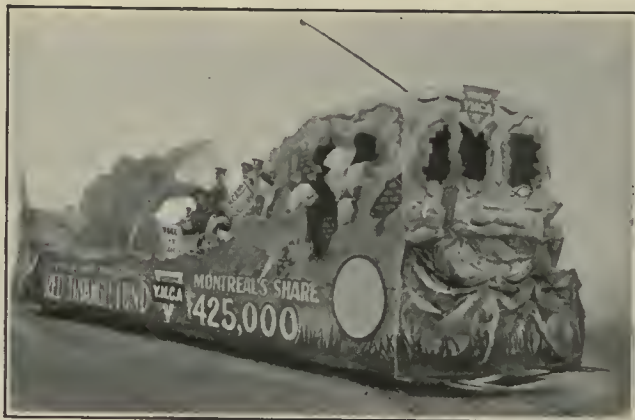
Class Compartments May Be Abolished in Manila

THE cars of the Manila Electric Railroad & Light Corporation are still divided into first-class and second-class sections with different rates of fare, but there may be only one class if suggestions made by C. N. Duffy, vice-president of the company, at a recent hearing before the Public Utility Commission are carried out. The division between first and second class is made now only by a rope barrier stretched across the car, so that on a double-end car the seats which are first class on the outbound trip are second class on the inbound trip and vice versa.

The statement by Mr. Duffy was made during a hearing before the commission on the subject of the desirability of an order limiting the number of passengers on the cars. Mr. Duffy argued against such an order and suggested in its place the abolition of the class-division mentioned, a change in the fare so that the rate will be 8 centavos with 1 centavo extra for a transfer, with the fare for children at 5 centavos, including the right to transfer, and that the present practice of selling tickets be abolished.



RED CROSS FLOAT AT DALLAS



Y. M. C. A. FLOAT IN MONTREAL

Car Floats Help Bonds and Red Cross Campaigns

Flat Cars Converted Into Patriotic Floats Symbolizing Present-Day War Need Lent Effective Aid in Recent Campaigns

THE ordinary flat car on an electric railway furnished the ideal basis for a parade float. As compared with the float drawn by horses it is far superior, being limited in neither size nor speed. It can be used, of course, only on streets with tracks, but this is not a hampering condition in most cases, because the principal streets usually have tracks.

During the recent Liberty Loan and Red Cross campaigns several electric railway companies operated floats of this character and views of a few of them are published as supplementary to those which have appeared in prior issues.

The first view shows a work car of the Dallas Railway used as one of the features of the Red Cross drive in Dallas on May 18 and carrying suitable sayings and decorations. It was escorted by Red Cross nurses and Uncle Sam's own soldiers, and was followed by a car carrying the Camp Dick cadet band of forty-two pieces. These cars paraded all Saturday afternoon and night and made a great hit. The car was furnished through the efforts of H. B. Fisher, assistant to the manager.

The second illustration represents "Fort Liberty," built by the Manila Electric Railroad & Light Corporation and used during the last Liberty Loan campaign in that city. The foundation was one of the company's double-truck flat cars equipped with motors and it was built up to represent a masonry fort, equipped with cannon and machine guns. The fort was outlined in incandescent lamps and carried a representation of the Statue of Liberty and the words "Fight or Buy Bonds." A third view illustrates a float used during the Y. M. C. A. campaign for funds in Montreal. The flat car in this case was one having an

operating cab at one end, and this cab was utilized to form a representation of a Y. M. C. A. hut, while the "trenches" were constructed of sand bags. Altogether the float was very realistic, and as it carried a bugle band it attracted great attention.

The Mahoning & Shenango Railway was another company to build an electric railway float for the last Red Cross Campaign.

Public Good-Will Is an Asset

EVENTS of the last year, according to a recent statement issued by H. L. Doherty & Company, New York, N. Y., have proved to managers of public utility corporations the great value of public good-will. An analysis of the rate situation existing throughout the United States shows that in almost every instance where there has been concerted opposition by the public to a proposed advance, the utility has not enjoyed good relations with the public served.

In communities where the utility has taken the attitude that it is much more of a necessity to the public than the public is to it, great difficulty has been encountered in securing any adequate revisions of rate schedules. On the other hand, where a utility has recognized that the relations between it and its public are reciprocal, the utility has had fairly smooth progress in securing adjustments to meet the increased cost of operation.

Wherever utility managers have been vitally interested and personal factors in the growth and the prosperity of the communities

served, they have encountered no great amount of opposition in advancing rates to a living level. The public generally now realizes that rates for utility service must be advanced and, where adequate service has been furnished and proper consideration given to the needs of the community, the public is not adverse to giving a proper rate. Recently, it is related, a delegation from a city in which a



FLOAT TO REPRESENT MASONRY FORT, USED DURING LAST LIBERTY LOAN CAMPAIGN IN MANILA

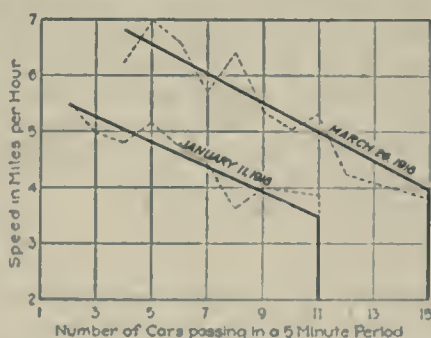
Cities Service Company lighting subsidiary operates, visited the general office of the company. In this delegation were the Mayor, the city attorney, members of the City Council, the editor of the principal newspaper and other public officials. They came to ask whether the Cities Service organization could not formulate some plan by which it could take over operation of the electric railway system in that city. The Mayor said that the lighting company did not ask enough of the city, and other city officials said that they stood ready to grant any proper demands. In so far as the electric railway was concerned, the first consideration was Cities Service operation, with all other matters coming second.

Loading Platforms and Front-End Collectors in Washington

Report Recently Issued by Mr. Beeler Describes the Results from Improvements Introduced Earlier in Year

THE eighth section of Mr. Beeler's report on Washington traffic conditions dated May 23 has recently been made public. It is quite brief and, in general, summarizes the results secured through the adoption of some of the previous recommendations, principally those on reduction of stops, double berthing, loading platforms and front-end fare collection and recommends the extension of these practices at certain points. The

accompanying diagram shows clearly the effect on speed and track capacity of the methods adopted for relief on the Fifteenth Street throat, where the capacity of track was increased from 132 cars to 180 cars per hour between the two



SPEED AND TRACK CAPACITY AT FIFTEENTH STREET THROAT BEFORE AND AFTER CHANGES WERE MADE

dates given on the chart. Mr. Beeler thinks further improvement possible as the trainmen become more used to the new methods and use the double berths more effectively and as the movements of the cars are better co-ordinated with the signals of the traffic police and the front-end collectors.

MORE LOADING PLATFORMS NEEDED

The report recommends more loading platforms, notably on Pennsylvania Avenue, and says that those installed have proved a distinct help in insuring the safety and comfort of passengers as well as of speeding up the movement of cars by permitting easier and more rapid ingress and egress. They not only concentrate those desiring to board in an absolutely safe zone right at the point where the car will stop, but they are also a great aid to the front-end collector, who is enabled to devote his entire time to car patrons, as he can operate in safety.

Experience in Washington has demonstrated the advisability of placing platforms opposite each other wherever practicable. A form of concentrated safety zone is thus established. The inspector or front-end collector on one platform has an opportunity to observe conditions existing on the other. The cross travel between platforms and curbs is concentrated so that automobile drivers have less difficulty in watching pedestrian movement, as the two platforms are passed simultaneously instead of singly. Street cars are also passing each other slowly. As passengers pass to and from either side of the street, a clear view of both roadways is a great advantage.

Although protected by red lights after dark, several times since the platforms have been installed careless automobile drivers have tried to run over them. To enhance their visibility and improve their appearance generally, the report says that the risers should be kept well painted, either a light gray or a buff. The dimensions of those now in use are 6 ft. wide, 96 ft. long and 9 in. high.

Mr. Beeler recommends loading platforms at all car stops where the number of passengers handled is such that standing time at stops can be reduced materially and where the platforms as a safety measure are desirable. He also recommends double berthing at all stopping places on paved streets in the District of Columbia except where the second car will block an intersecting street. This does not mean that the second berth will be in constant use, as when the cars are properly spaced there will be no occasion for stopping in the second berth, but during the rush hours and at times of unusual conditions, the service can be materially speeded up if this plan is adopted.

FRONT-END COLLECTION

The advantages of front-end collection are mentioned as being (1) decrease in loading time because passengers get on the cars simultaneously, and (2) more even loading of the cars. The front-end collector is of distinct advantage to patrons because he can sell tickets and make change before the cars arrive, as well as collect fares. The report points out that one front-end collector can often cover two points where the rush periods of the two do not coincide.

Texas Employees Form Mutual Aid Society

Employees of the Galveston (Tex.) Electric Company have organized a mutual benefit association the object of which is to extend financial aid to members who may become ill or meet with financial reverses through any cause. The organization has 166 members and has been granted a charter by the Secretary of State at Austin.

All funds of the association will be obtained through the payment of dues of \$1 a month by each member and the company has agreed to pay \$1 a month for each member. This gives the association an income of \$332 each month. Under the plan of extending aid, any member who becomes ill or suffers an accident will be paid \$2 a day after the fifth day for a period of 120 days and \$1 a day thereafter for a period of 60 days, making \$300 as the maximum benefit. In case of death the beneficiary will receive \$1,000.

Getting the Zone System Started at Providence

Initial Difficulties in Fare Collection Have Been Overcome, and Zone System Is Now In Full and Satisfactory Operation on the Rhode Island Company Property

THE zone system of fare collection has been in operation on the property of the Rhode Island Company since the first week of May. The decision to use this system was reached after long discussion in the Legislature, and there was up to the last a very strong sentiment in favor of a flat increase in fare from 5 cents to 6 cents. While early in the controversy the company would have been glad to have this flat increase as a temporary expedient, toward the end of the discussion it strongly advocated the zone system as a more general solution of its difficulties, the time when a flat increase of 20 per cent in fare would have been effective having gone by. The company realized that there would be difficulties to face in the matter of fare collection, but it was thought that these had better be faced at the start and overcome once for all rather than temporizing with the simpler but less comprehensive expedient. The story of the development of the present plan has been traced from week to week in the columns of the ELECTRIC RAILWAY JOURNAL and need not be repeated here. The purpose of the present article is to state briefly what has occurred since the zone plan went into effect on May 5. There are two aspects of the fare collection situation in Rhode Island, namely, the urban and the interurban. In the cities the Rhode Island Company has used and will continue to use the Rooke register, while between cities a ticket system is employed. The registers originally contained two counters, one for nickels and one for dimes. The manufacturers have now rearranged the registers to indicate nickels, 2-cent metal tickets or tokens, and dimes. Fortunately it was possible to do this with very little difficulty. The registers, are used for collecting 5, 7 and 9-cent fares. The construction is such that the nickels register on their own counters only, the metal tickets register on their own and the 5-cent counters, while the dimes register on their own counters only.

The metal tickets are not sold to the passengers but are handed to them in the 2-cent zones and immediately deposited in the register. It has not been found expedient so far to sell the tickets in quantities, and it is doubtful if this will be done later. On boarding the car the passenger deposits a nickel in the register, and the conductor goes through the car in each 2-cent zone collecting a fare from each passenger who has boarded the car in another zone. At first a twelve-sided ticket was used, with the idea of making it distinguishable from a

coin by sense of touch. This form proved unsatisfactory in the register, however, on account of the inequality in diameter. The present form of metal ticket, full size, is shown in an accompanying illustration.

On the face of the metal ticket is this legend: "Two-Cent Zone Fare Tickets, the R. I. Co.," and on the re-

JAN.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
FEB.	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
WAR.	<div>THE RHODE ISLAND COMPANY</div> <div>Providence—Buttonwoods via Broad St. Line</div> <div>PASSENGER'S RECEIPT</div> <div>Passenger's receipt for fare paid. Passengers will please observe that the stations from and to which they pay are properly indicated by conductor's punch. Good only for use of passenger to whom issued and on date punched.</div> <div>Form 6-4</div> <div>Gen'l Manager</div> <div>89</div>															
APRIL																
MAY																
JUNE																
JULY																
AUG.																
SEPT.	Buttonwoods	Station	Oakland	Warwick	Logan	Com	Hortle	Latwood	Walle	City	Line	TRANS	PROV	TO		
OCT.																
NOV.																
DEC.																

FIG. 1

Serial No. 65	AUDITOR'S CHECK	7 CENTS	2 CENTS	TRANSFER	<div>THE RHODE ISLAND COMPANY</div> <div>THIS TICKET IS EVIDENCE OF PAYMENT OF A</div> <div>7 CENT FARE</div> <div>Between Providence and Warwick and Walle Aves.</div> <div>IN EITHER DIRECTION</div> <div>Good only for use of passenger to whom issued and on date punched. Conductors must detach this slip from paid to presence of passenger paying fare. If Providence fare is paid with a transfer, conductor must punch in the following square in order to make proper accounting.</div> <div>Form 7</div> <div>Serial No. 65</div> <div>PROV. TRANSFER</div> <div>Pres. and Gen. Mgr.</div>															
					JAN.															
					FEB.															
					WAR.															
					APRIL															
MAY																				
JUNE																				
JULY																				
AUG.																				
SEPT.																				
OCT.																				
NOV.																				
DEC.																				

FIG. 2

Fig. 1—Passengers' part of duplex ticket first used in collecting zone fares by the Rhode Island Company. Fig. 2—Form of ticket now used on Rhode Island Company's interurban lines, replacing that shown in Fig. 1.

PAST AND PRESENT ZONE-FARE TICKETS, RHODE ISLAND COMPANY

verse is "Good Only for Continuous Ride After Five-Cent Fare Has Been Paid."

PAPER TICKETS USED ON THE INTERURBANS

When the zone system was first inaugurated a duplex form of ticket was used on the interurban lines, as shown in Fig. 2. The conductor punched the fare paid and the passenger retained one part of the ticket as a receipt, the other being the auditor's check. It was found almost immediately that this form of ticket was unsuitable for the local conditions for two reasons. In the first place, its use required too much of the conductor's time in punching and in detaching the passenger's sections. In addition, at the end of the run a half hour or more of the conductor's time was consumed in balancing his accounts so as to turn in the proper amount of cash.

Accordingly the duplex ticket was abandoned, except for passengers riding between intermediate points only,

and a new ticket of the form shown in Fig. 2 was adopted. In this form a distinctive color is used for each zone and the amount of the fare is printed plainly on the face of the ticket and on the stub. The tickets and stubs are serially numbered. All that the conductor has to do is to punch the dates on a number of tickets in advance, and when a passenger tenders a transfer as part payment of fare the conductor punches a hole in a space provided for this purpose. At the end of the run he simply has to subtract the serial numbers of



FIG. 3—METAL TOKEN USED IN TWO-CENT FARE ZONE

2 Paying Fares by the Zone System

PAYING FARES BY THE ZONE SYSTEM

THE new zone rates have been in effect a few days now and the system is beginning to work pretty smoothly. A big task has been imposed upon the employer of the Company in making clear to passengers all the rules and regulations governing the new order of things. We ask the indulgence of the riding public while they and we are becoming familiar with the zone plan.

On the urban lines, that is in the zones where the fare is either 5, 7, or 9 cents, the automatic register is used as in the past. The 5 cent fare is collected to the end of the 5 cent fare zone. After passing that limit, the remaining fare, either 2 or 4 cents, is collected through the automatic register, metal tickets valued at 2 cents each being used for this purpose. The new register contains a dial and counter which segregates the metal ticket from the nickel.

On suburban lines, a Duplex ticket system is in use, the ticket being similar to that used on street cars when passengers pay a cash fare. Passengers pay their fare from point of boarding car to destination, and conductors issue a Duplex ticket to them, showing between what points fare has been paid.

6 Paying Fares by the Zone System

direction of Providence, where the city limits of Pawtucket and Providence shall continue as the transfer limit between the cities.

The single 5 cent fare and transfer limits on the several street car lines entering and leaving this zone are indicated below:

Lines	Fare and Transfer Limit
1. Pawtucket-Rhode Is.	All Pawtucket city line, on Rhode Is. line, on
2. Providence Road	All Pawtucket city line, on North Main St. line, on
3. Southside Ave.	All Pawtucket city line, on Southside Ave. line, on
4. Mineral Spring Ave.	All Pawtucket city line, on Mineral Spring Ave. line, on
5. Prospect St.	All Pawtucket city line, on Prospect St. line, on
6. John St.	All Pawtucket city line, on John St. line, on
7. Broad St.	All Pawtucket city line, on Broad St. line, on
8. North Attitash	All Pawtucket city line, on North Attitash line, on
9. South St.	All Pawtucket city line, on South St. line, on
10. Attitash	All Pawtucket city line, on Attitash line, on
11. Pawtucket-Rhode Is.	All Pawtucket city line, on Rhode Is. line, on

3. Woonsocket Single 5 Cent Fare and Transfer Zone

The Woonsocket Single 5 Cent Fare and Transfer Zone shall include the area in the State of Rhode Island within a radius of approximately two miles from Main Street terminal, Woonsocket, as a center. The single 5 cent fare and transfer limits on the several street car lines entering and leaving this zone are indicated below:

Lines	Fare and Transfer Limit
1. Pawtucket-Rhode Is.	All Pawtucket city line, on Rhode Is. line, on
2. Providence Road	All Pawtucket city line, on North Main St. line, on
3. Southside Ave.	All Pawtucket city line, on Southside Ave. line, on
4. Mineral Spring Ave.	All Pawtucket city line, on Mineral Spring Ave. line, on
5. Prospect St.	All Pawtucket city line, on Prospect St. line, on
6. John St.	All Pawtucket city line, on John St. line, on
7. Broad St.	All Pawtucket city line, on Broad St. line, on
8. North Attitash	All Pawtucket city line, on North Attitash line, on
9. South St.	All Pawtucket city line, on South St. line, on
10. Attitash	All Pawtucket city line, on Attitash line, on
11. Pawtucket-Rhode Is.	All Pawtucket city line, on Rhode Is. line, on

FIG. 4—SAMPLE PAGES FROM BOOKLET ENTITLED "PAYING FARES BY THE ZONE SYSTEM," ISSUED BY THE RHODE ISLAND COMPANY

the stubs at the beginning and end of the run, multiply this by the rate of fare and subtract 5 cents for each transfer, to give him his total. The maximum number of pads required on any one route is eight and the conductors readily handle this number. The amount of time now required for accounting purposes by the conductors is negligible. In deciding upon the methods of fare collection the company has had in mind that these must be such as to be easily understood by the employees and the public, there must be a minimum of clerical labor, particularly for the conductors, and the system must not lend itself to intentional or unintentional mistakes. The plan now in use seems to meet

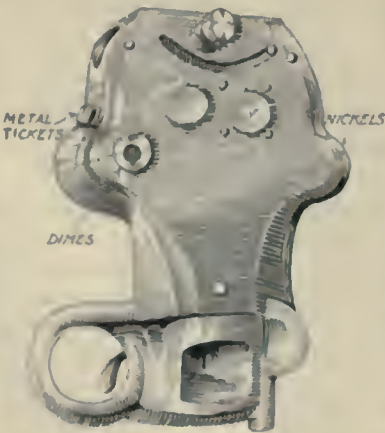


FIG. 5—FARE REGISTER REMODELED FOR USE IN ZONE FARE COLLECTION

the requirements in these particulars, but may be improved still, as more experience is had with the system. An element of very great importance in an innovation of this kind is the attitude of the public, and the intelligence with which the public co-operates with the company management in putting the new scheme in operation. In this case there had been so much agitation in regard to an increase in fares for the Rhode Island Company that the public was on the *qui vive* and was very curious to see how the company was going to handle the rather difficult situation. The whole matter was explained in advance by means of newspaper advertising, but it was not found necessary to continue this very long. A booklet was prepared, however, with the title "Paying Fares by the Zone System for distribution through the "take one" boxes in the cars. Sample pages from the booklet are reproduced in Fig. 4. The booklet contains diagrams similar to those reproduced on page 572 of the issue of the ELECTRIC RAILWAY JOURNAL for March 23, 1918.

Zone Postal Law Condemned

Charles E. Hughes Calls It "Unjust to Publisher and Unjust to Public"

ALTHOUGH Congress has yet declined to change the provisions of the second-class postal law requiring zone rates for periodicals, the publishers still believe they can prove the destructive and iniquitous nature of the law. The position of this paper remains, as it has been, utterly opposed to the plan. Following is a letter recently received by the Publishers' Advisory Board from Hon. Charles E. Hughes, who was the head of the Hughes Postal Commission which made the latest investigation of the Postal Department of the country.

In answer to your letter, I beg to say: I prefer not to accept a retainer to appear before legislative committees upon matters of general policy, as in such matters, if I have anything to say, I desire to speak only as a citizen. I have no hesitation in saying that I regard the zone system of postal rates for newspapers and periodicals, coming under the definition of second-class mail matter, as ill advised. The Commission on Second-Class Mail Matter (appointed in 1911), of which I was a member, considered this question and reported unanimously against the zone system. We said in that report:

The policy of zone rates was pursued in the earlier history of our post office and has been given up in favor of a uniform rate in view of the larger interest of the nation as a whole. It would seem to the commission to be entirely impracticable to attempt to establish a system of zone rates for second-class mail matter. Progress in the post office, with respect both to economy in administration and to public convenience, leads away from a variety of differential charges to uniform rates and broad classifications. In my judgment the zone system for second-class mail matter is unjust to the publisher and unjust to the public. It not only imposes upon the publisher the additional rates upon a sectional basis, but it makes necessary the added expense for the necessary zone classifications at a time when every economy in production and distribution is most important. It introduces a complicated postal system to the inconvenience of the publisher and public when there should be a constant effort towards greater simplicity. There is no more reason for a zone system of rates for newspapers and magazines than for letters. Newspapers and magazines are admitted to the second-class postal rates on the well-established policy of encouraging the dissemination of intelligence, but a zone system is a barrier to this dissemination. If it is important that newspapers and magazines should be circulated, it is equally important that there should not be sectional divisions to impede their general circulation through the entire country. We are proud at this moment of our united purpose, but if we are to continue as a people to cherish united purposes and to maintain our essential unity as a nation, we must foster the influences that promote unity. The greatest of

these influences, perhaps, is the spread of intelligence diffused by newspapers and periodical literature. Abuses in connection with second-class mail matter will not be cured by a zone system of rates. That will hurt the good no less than the bad, and perhaps some of the best sort of periodical literature will be hit the hardest.

We do not wish to promote sectionalism, and "one country" means that in our correspondence and in the diffusion of necessary intelligence we should have a uniform postal rate for the entire country. The widest and freest interchange is the soundest public policy.

I hope that Congress will repeal the provision for the zone system which is decidedly a looking-backward and walking-backward measure.

Readers of this paper can aid in the repeal of this law by writing to the Congressmen and Senators from their State urging prompt action.

Never Spend a Penny

How Northern Ohio Traction Employees Have Put the Copper Coin to Work for Uncle Sam

BY E. BURT FENTON

Publicity Agent Northern Ohio Traction & Light Company,
Akron, Ohio

LAST autumn, after war taxes became attached to almost everything, a vast number of copper pennies began changing hands. On many things—railway fares, tobacco, moving picture tickets and the like—the tax came in "odd" amounts. Even the Sunday newspapers jumped to 7 and 8 cents. The masculine pocket began to fill up with copper coins, and it became an effort to get rid of them.

Along in January, when the Thrift Stamp and its big brother, the War Savings Stamp, were not so well known as they are now, the writer had occasion to wait several hours at a junction railway station. In the effort to "kill" time, he followed the usual routine. He weighed himself on two or three different penny-in-the-slot scales, dropped into a cigar store and bought some tobacco he didn't need at the moment, and looked about for whatever other penny-spending diversion the small town might offer.

A War-Savings Stamp sign attracted attention and started a train of thought. Uncle Sam was appealing for small amounts of money—a quarter at a time. He was offering a fairly attractive inducement to his nephews and nieces for the use of their small change. Why not lend him the pennies we had been throwing away? They wouldn't amount to much, to be sure, but every billboard was fairly shrieking that "every little helps."

Right there the writer organized himself into a never-spend-a-penny club with a membership of one. And he got the surprise of his life. Within thirty-six hours there were enough pennies for one Thrift Stamp. Another twenty-four, another stamp. Thirty-six more, still another. In an incredibly short time a card was filled. Then another. As this is written, there are four of them, with a starter on the fifth.

Each day fifteen to twenty pennies are dropped into the special pocket reserved for the change from ordinary small expenditures. Instead of being wasted, as of old, they are put to work for what they are worth to Uncle Sam. They do not represent a single sacrifice. They are the financial "slack" of the ordinary man, taken up and made useful—to Uncle Sam? Partly. But to a greater extent to the owner.

Naturally, when we saw how the never-spend-a-penny scheme was going, we talked to our friends about it. They caught the "bug" and began doing likewise. All were surprised to find out in this manner how much money they had been throwing away without being aware of it. Every day at luncheon there was a general "counting up," and some competition developed to see who could buy the most Thrift Stamps in a given time.

In April it occurred to the "penny-pinchers," as they called themselves, that it would be a good thing to spread the idea through the entire N. O. T. & L. organization. Permission was readily obtained, and the Never-Spend-a-Penny Club was authorized. Pledge cards, such as shown in the accompanying illustration, were distributed among the 2500 employees of the various departments. There were no dues, no initiation fees, no officers and no red tape. The employee who wanted to be identified with the movement simply signed his pledge and received his certificate—and then proceeded to save his pennies. At present more than 1000 officers and employees have signed pledge cards, and nearly all are growing enthusiastic as they see how rapidly they accumulate stamps.

It is not intended that the never-spend-a-penny movement shall do away with other war-savings work.

THE N. O. T. & L. CO. NEVER-SPEND-A-PENNY CLUB MEMBERSHIP PLEDGE

No. _____ 1918.

The undersigned hereby agrees to become a member of the
N. O. T. & L. NEVER-SPEND-A-PENNY CLUB,
and pledges himself (or herself) to observe the following covenants.

1. To save all pennies (one cent pieces) I receive in change for purchases of all sorts and kinds for the period of one year from date.
2. To invest the pennies so saved in War Thrift Stamps each time the accumulation amounts to Twenty-five cents.
3. To turn these War Thrift Stamps into War Savings Stamps (of \$5.00 each) as soon as Thrift Cards are filled.

Occupation _____ Name _____

Department _____ Address _____

Name Published in Traction Bulletin _____

MEMBER'S CARD OF NEVER-SPEND-A-PENNY CLUB

In fact, the majority of the officers, department heads and employees are regularly investing each week from 50 cents up in "real" money in Thrift Stamps, and practically all are owners of Liberty Bonds. In many instances they are literally "giving till it hurts"—but nobody counts the penny savings as a "hurt." It is more like finding money and is so regarded. Nor is anyone pluming himself on the patriotism involved in these particular savings. As a shop foreman expressed it:

"I guess I'm patriotic, all right, but I don't see how I can throw bouquets at myself and wrap up in a flag when I get 99 per cent of the good of the system and Uncle Sam the other one. When I want to show my patriotism, I'll buy some more Liberty Bonds I can't afford and cut out a few meals to pay for them."

It is too early to give an accurate estimate of the aggregate of the never-spend-a-penny savings of the organization, but "Old Figgers" of the accounting department, using a conservative guess as a basis, says it will amount to between \$1,500 and \$2,000 per month for the present membership. And there are several back townships yet to be heard from.

LETTER TO THE EDITORS

Decrease in the Efficiency of Common Labor

FIRST NATIONAL BANK BUILDING

CINCINNATI, OHIO, July 1, 1918.

To the Editors:

In the constantly rising cost of construction, the contractor is always in touch with the market price of material and the wages of labor, but there is another hidden factor which must now be taken into account, and that is the efficiency of the available labor. This I have attempted to analyze into usable form.

In my occupation I am concerned primarily with the cost of the new construction of a public utility company operating gas properties, and of course, an addition to the gas distribution system means trenching or excavation by the utilization of common labor with pick and shovel. It seems logical that any condition of the quality of labor which is experienced in our trenching work would be reflected in any contracting which involves excavation, deep or shallow (and probably other lines), but I confine my conclusions to excavation.

During 1917 I noticed that the men doing the digging seemed somewhat older than formerly. I asked the foreman about it and he replied that the labor was not so good as he had previously had, but they were the best men he could get. Now, it is manifestly impossible for any public utility, or contractor, with whom I have any acquaintance, to pay such wages as are offered in munition plants or other industries making big profits. They therefore suffer in the competition and must content themselves with what they can get.

Construction which is not essential to the prosecution of the war has been reduced to a minimum, but considerable municipal and private work involving excavation must be done nevertheless, and it is for contractors contemplating figuring on this work that these deductions are intended.

Let us consider the general condition of the labor market since 1910, and compare it with figures from my experience. From 1910 to 1914 inclusive, times were not especially thriving and there was plenty of good labor. In 1915 war work for the Allies started and labor became in demand. Profits and the volume of business mounted, needing more men, and wages rose. With the rise in wages, however, the munitions manufacturers were still able to attract efficient labor for their money. The increasing cost of living forced men to seek better paying work. This continued throughout 1916, until in 1917 with our entrance into the war came the draft. The drain was then even more intense.

We, as most other public utilities, tried to meet the labor competition by increasing wages some 20 per cent, or more, during that period.

Let us see what we were getting for our money. In making this analysis, I have gone over all of the trenching work we have done since 1910. Knowing the character of the ground in every case, I selected all of the work done in ground of similar nature. Some jobs which presented peculiar conditions I rejected. The remainder I divided into four periods, as follows: 1910 to 1914, 1915, 1916, 1917.

There were plenty of examples of each period to make the average representative. The work in every case consisted of digging a trench 18 in. wide by 24 in. deep for various lengths between 200 and 400 ft., i. e., long enough practically to eliminate the factor of time lost in getting started on small jobs.

The time required to do this trenching was taken from the records. The number of cubic feet of earth that a man can excavate in an hour can properly be considered a measure of his efficiency.

Following is a table of the years, the corresponding number of cubic feet of earth excavated per man per hour, the efficiency in per cent and the time required to remove 5.2 cu.ft. of earth in per cent, as compared to the operation in 1910-1914:

Year	Cubic Feet per Hour	Efficiency, Per Cent.	Hours to Remove 5.2 Cubic Feet
1910-1914	5.2	100	1.00
1915	5.0	96.1	1.04
1916	4.6	88.4	1.13
1917	4.0	76.9	1.30

Now if the efficiency of the labor diminishes at the same rate in 1918 as it did in 1917, we shall have for 1918 an efficiency of 65.4 per cent requiring 1.44 hours to remove 5.2 cu.ft., or what was formerly done in one hour. The increased time required to do a certain piece of work over last year is 11 per cent calculated ($1.44 - 1.3 = 1.1$).

While we have not done sufficient trenching in 1918 for me to calculate the percentage, from what I have seen of the labor on the work so far this year I would say it bids fair to follow the theoretical probabilities outlined above. The fact is, the men are not so strong and, although willing, they simply cannot keep up the former pace.

In conclusion, I would urge any contractor or company contemplating excavating or similar work this year to study carefully the hours consumed in excavating a unit of material in 1917, then after looking over the labor market, allow a certain amount of additional time to accomplish the same character of work this year. For our own local conditions I would add not less than 15 per cent. In any other locality it may be more or it may be less, but from the common history of the last four years and what our own figures show, I feel safe in affirming there is not a locality in the country where the average efficiency of common labor has not diminished at least 8 per cent, and in some cases as much as 25 per cent.

This is a factor though that requires careful individual study for each locality, but time used in the study will probably be well spent. A. G. DRURY.

Shipbuilding at Tampa

At Tampa, Fla., there is one yard for wooden ships and another for steel. The wooden yard employs 800 men, while the steel yard expects to attain 2500. No extra construction, except a $\frac{1}{2}$ -mile extension was required of the Tampa Electric Company. Extra cars are run morning and evening in accordance with the requirements. Owing to the recent addition of safety cars, fifteen on hand and eight due in a few weeks, there is no shortage of rolling stock.

Balancing Relays in Parallel Feeders by Cross-Connected Reverse-Power Relays

WHILE, in general, transmission and distribution systems can readily be sectionalized by the standard application of overload and reverse-power relays, there are often conditions under which these methods do not suffice. Some of these can be handled readily by a balanced system of relays, two methods of which, the pilot-wire system and the split-conductor system,

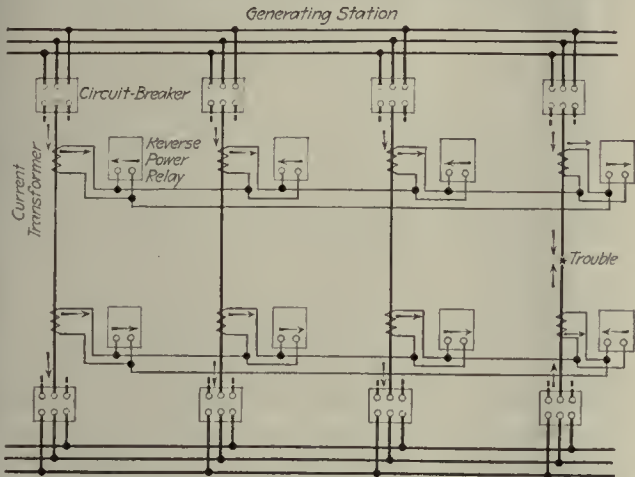


FIG. 1—DIAGRAM OF CROSS-CONNECTED RELAY SYSTEM. ARROWS SHOW DIRECTION OF POWER WITH SHORT-CIRCUIT ON RIGHT FEEDER

have been in use for some time. A later method of balancing relays on parallel feeders is the cross-connection of reverse-power relays.

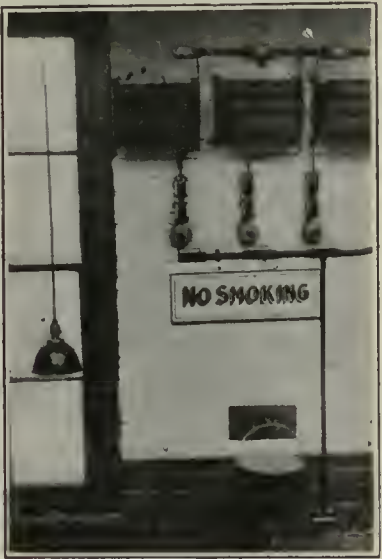
The schematic diagram in Fig. 1 shows the connections of Westinghouse type CR cross-connected reverse-power relays applied to a system consisting of a generating station and a substation connected by four parallel feeders. To simplify it, the diagram shows one phase only of each of the feeders. A complete diagram of connections for a pair of three-phase feeders (ex-

protected by these cross-connected relays the current through the cables will still be balanced and, consequently, there is no force tending to operate the relays. On the other hand, if trouble occurs on a cable within the section, the current through the defective cable will be higher than that in the others, and the excess current from its current transformers must, therefore, pass through the relays. While, under this unbalanced condition current will flow through all the relays, the current is in the proper direction to cause the relay to act only in the relays at each end of the defective cables (see direction of arrows in diagram).

Pallet switches connected in the transformer secondary circuit are shown in Fig. 2. These are also connected mechanically to the operating mechanism of the breaker so that when the the breaker opens the current transformers on the feeder controlled will be short-circuited. By this method a cable can be cut out of service without interfering with the electrical balance in the current-transformer circuit.

Convenient Wiring for Battery Charging

AT THE Carew Street carhouse of the Springfield (Mass.) Street Railway, storage batteries used in company automobile ignition service are conveniently charged from the 600-volt trolley supply as shown in the accompanying illustration. A positive lead is tapped from the trolley in the carhouse through a 25-amp. inclosed fuse not shown and carried in conduit to a set of three resistors mounted on the wall. From each rheostat a tap is run through a 6-amp. fuse and snap switch to a horizontal bus carried in conduit and leading to the battery terminals. The return from the battery is brought back through the conduit fitting as



AUTOMOBILE IGNITION BATTERIES CHARGED FROM TROLLEY

shown and carried to ground through the curved duct indicated at the right-hand side of the illustration. Closing each switch permits 4 amp. to flow through the battery, so that a range of from 4 to 12 amp. is obtained at a low pressure of about 6 volts, usually required by a few cells in series.

This method for charging the companies automobile ignition batteries was adopted as the material required for its construction was available from stock and the small amount of charging to be done would not warrant the expense necessary to purchase a motor-generator set, which would cost approximately \$150. Any saving that would be obtained from the use of such a set instead of the above method would not pay for the additional maintenance, interest and depreciation.

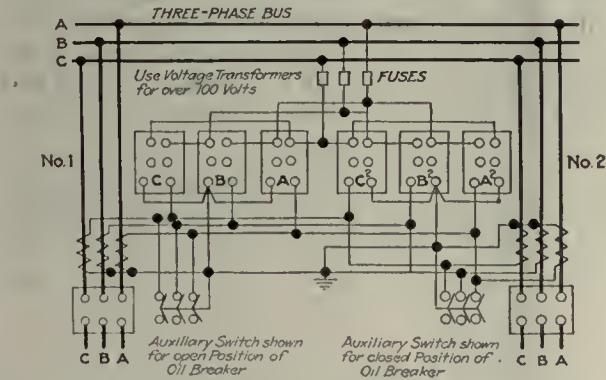


FIG. 2—DIAGRAM OF CROSS-CONNECTED RELAY SYSTEM FOR THREE-PHASE CIRCUIT COMPLETE EXCEPT FOR TRIP CIRCUIT

cept that the tripping circuit is omitted) is shown in Fig. 2.

Under normal conditions, the load in each of the cables will be the same and, since the relays have a higher impedance than the current transformers, the current from the latter will circulate through all of them in series without any flowing through the relays. If the trouble occurs at any point outside the section

Electric Tractors for Freight Hauling Helps Solve Shortage-of-Labor Problem

A SYSTEM of handling freight on the piers by means of electric tractors and trains of trucks has recently been inaugurated by the Pennsylvania Railroad, which operate piers Nos. 4, 5, 27, 28, 29, 77 and 78 in the North River, New York City.

This novel method of handling freight has proved



AN ELECTRIC TRACTOR HAULING TWO FREIGHT TRUCKS

very satisfactory and has released several hundred men for other forms of work. Hand trucks were formerly used in transferring this freight to and from the cars.

As the manual labor required in the operation of these tractors is not severe, female employees have been handling them. The girls work eight hours per day and receive the regular compensation formerly paid to men. This is another instance of where labor-saving equipment releases labor, not only through the more efficient handling of the freight to be loaded into and unloaded from the cars, but also by reducing the severity of the work so that women can be made use of. The same scheme might apply in electric railway freight stations.

Track Rails Hardened While in Service

EXTENSIVE renewal of the rails used by electric operating companies is now considered out of the question in view of the great difficulty experienced at the present time due to the shortage of rails and of labor necessary for their installation. With a view of prolonging the life of the track a treatment of rails has recently been devised by C. P. Sandberg which consists of hardening or tempering the head of the surfaces of the rails by heating them and subsequently quenching or cooling them quickly. The process now being applied by the Sandberg Sorbitic Steel Company, Ltd., London, has been tested experimentally on the Leeds Tramways and is now having its first application under regular working conditions on the Corydon Tramways in England.

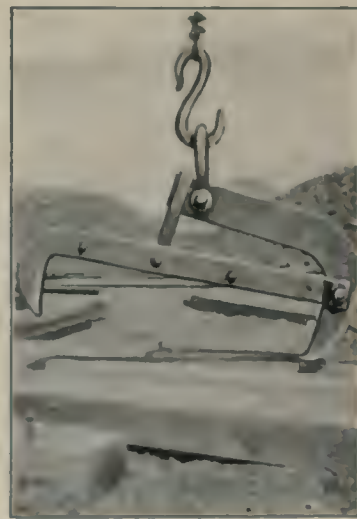
The process consists in causing a flame to travel slowly along the surface of the rail under treatment, this heating being followed by the application of a water jet for quenching or cooling. The work being carried out at Corydon is effected by an oxy-acetylene flame, but other methods of heating may be used if desirable. The apparatus necessary for heating the rails and supplying the water is mounted upon a truck which is arranged to be operated along the track at a certain definite speed by means of a geared hand wheel.

From photo-micrographs which were taken of the Corydon rails it was found that the hardening was carried out on the rails to a depth of about $\frac{1}{4}$ in., diminishing to zero on the outside edge of the rail. If this heat treatment can produce a hard head it is sure to result in a considerable increase in the life of the rails and the wear will be greatly retarded.

Further details of the application of this treatment are given in recent issues of *Engineering*, London, and *Electrical Review*, London.

Saving Man Power on the Tie Pile

THE tie lifting device shown in the accompanying illustrations has been developed at the Harvard yard of the Cleveland (Ohio) Railway, and is designed to carry six ties with the broad side longitudinal. It can be used in loading ties from the storage pile to the work train, or vice versa. One arm is made of twin pieces $\frac{3}{4}$ in. x 6 in., bolted together, $1\frac{1}{4}$ -in. apart, and the second arm is $1\frac{1}{4}$ in. x 8 in., pivoting in the other arm on a $1\frac{1}{2}$ -in. bolt, as indicated in the figures. The arms are made adjustable for width of jaw to accommodate special sizes of ties, and in like manner the point of application of the lifting hook is adjustable to suit the center of gravity of the load. The greatest jaw width is 50 in. and the depth of carrying space is 10 in. A loop made of $\frac{1}{2}$ -in. x 2-in. material is provided to hook the two arms together in a favorable carrying position when no load is being trans-



TIES LIFTED BY DEVICE WHICH REPLACES EIGHT MEN, AND DETAILS OF TIE LIFTING DEVICE SHOWING ADJUSTABLE ARM

ported. One of the accompanying illustrations shows the device lifting five ties of the special size 8 in. x 9 in. x 9 ft.

At Cleveland the tie-lifting device is used in conjunction with a 15-ton Ohio electrically-operated crane. It is stated that ties can be loaded or unloaded at the rate of six ties per minute for the standard size tie, with one man to operate the crane and one man to place the device in position. The cost of using the equipment on a large loading job is estimated at 40 cents per hundred ties as against \$1.20 per hundred for hand loading with a crew of ten men. The tie lifter is said to replace the services of eight men.

News of the Electric Railways

TRAFFIC AND TRANSPORTATION

FINANCIAL AND CORPORATE • PERSONAL MENTION • CONSTRUCTION NEWS

No Peace by Understanding

Mayor of Seattle in Scathing Attack on Puget Sound Company Declares for a Rule or Ruin Policy

Mayor Ole Hanson of Seattle, Wash., in a recent communication to the City Council asks that the Puget Sound Traction, Light & Power Company be required immediately to pay its indebtedness to the city, and to observe its franchise obligations. Mayor Hanson characterizes the present railway service in Seattle as unbearable. In the communication he makes an attack on A. W. Leonard, president of the company, and reiterates his charges that the company is attempting to block the development of hydroelectric power by the city of Seattle.

COMPANY ENTERS DENIAL

Mr. Leonard denies any attempt on the part of the company to block any plan of the city to develop its hydroelectric project. In answering Mayor Hanson's statement that advertisements in the *New York Times* in connection with a recent offering of notes of the company indicated large net earnings, and that the railway in Seattle was not in need of relief, Mr. Leonard said:

"The fact is, the earnings of the Puget Sound Traction, Light & Power Company and subsidiary companies are exactly as stated in the advertisements. This has no bearing on the fact that the railway in Seattle is in a serious financial condition, and that money required for increasing facilities in this branch of the business cannot be secured until net earnings have been improved by an increase of fares, by the reduction of operating expenses or the elimination of franchise burden. Neither can sufficient wages in addition to those now paid be offered to trainmen from the earnings of the railway itself to obtain employees in competition with shipyard wages."

MAYOR JUMPS TO THE ATTACK

In his communication to the Council Mayor Hanson said in part:

"While admitting that his company is earning more money than ever before in its history and while he runs large advertisements throughout the nation bragging about his successful profiteering in the city of Seattle, Mr. Leonard comes to the city officials and asks them for relief. After his company has refused to pay its honest obligations; after it has refused to pay its taxes; after it has refused to give the citizens service; after it has refused to sell 4-cent tickets; after it has refused to pave

its rights-of-way; after it keeps an average of sixty-five cars during the rush-hour periods in its carhouses at all times, all of which are needed to take care of overloads; after it has gone to every court available and been soundly and deservedly thrashed by our excellent legal department, it pleads for mercy. It seems to me that there can be no peace between the city of Seattle and the Puget Sound Traction, Light & Power Company. I, therefore, recommend to the Council that all mediation measures be abandoned; that we ask once more that the company pay its taxes and keep its obligations."

New Cincinnati Ordinance

Sub-committee Appointed to Draft Complete Revision of Electric Railway Franchise

A sub-committee of five members has been named by the Council and Citizens' Advisory Committee on Street Railroads at Cincinnati, Ohio, to draft a complete revision of the street railway franchise. It consists of Director of Street Railroads W. C. Culkins, City Solicitor Saul Zielonka or his first assistant, Dennis Ryan, Councilman Cliff E. Martin, and James A. Wilson and C. H. M. Atkins, members of the Citizens' Advisory Committee, appointed by the Mayor.

FORMER DRAFT AS A BASIS

A tentative draft was made some time ago and this will serve as a foundation for the sub-committee to complete a new revision. It covers everything not affected by the fare question. The idea of appointing a sub-committee originated in the belief that a smaller number of men can work more effectively than the full committees.

Before the draft can be finished, an understanding on the fare question must be secured and to this end all the data possible will be collected for the consideration of the sub-committee. The three plans so far considered are the flat rate, the zone system and the service-at-cost plan. It is said the committee favors the last.

OPEN HEARINGS LATER

When the draft is submitted to the full committee a series of open hearings will be held, at which voters and others may express their opinions freely. Sections will be taken up one at a time and agreements will be reached with the Cincinnati Traction Company, if possible, as the franchise discussion proceeds.

Gross Earnings Tax Upheld

Supreme Court of State of Washington Upholds Franchise Provision Requiring This Tax

In a recent decision, the State Supreme Court at Olympia, Wash., upheld the decision of Judge J. T. Ronald ordering the Puget Sound Traction, Light & Power Company to pay to the city of Seattle the sum of \$64,387, representing the 2 per cent gross earnings tax provided in the franchise.

The decision was signed by six Supreme Court judges. The court holds that the franchise provision for this tax is not in conflict with the constitution of the United States or contrary to the State public service commission law. It also rules that the Public Service Commission has no authority over franchise provisions.

The evidence showed the city made a demand for payment of the 2 per cent for the year 1916. The company made a counter proposal. This the city rejected. The company declared that it had been damaged to the extent of \$70,000 by the city ordinance of 1915, later held void by the Federal Court, requiring the sale of tickets on street cars. The city refused to pay this sum to the company after the ordinance had been declared void. This refusal and the attempt of the city to collect the 2 per cent tax, the company declared, impaired the franchise contract. This was denied by the Supreme Court on the ground that the city is not liable for damages in such cases.

ANOTHER CASE DECIDED

Another decision in favor of the city of Seattle against the Puget Sound Traction, Light & Power Company was recently handed down when Judge Mitchell Gilliam held that the city is entitled to its peremptory writ of mandate in the "second paving case." The paving case was instituted by the city in February, 1917, to compel the company to pave between its tracks on First Avenue South, from Stacy Street to Horton Street. The order for mandamus was held over until after the company's appeal for relief from franchise obligations had been passed on by the Public Service Commission.

Recently the Supreme Court ruled in a Tacoma case that the Public Service Commission has no jurisdiction in such an appeal and cannot grant relief from franchise obligations. On May 23 the commission dismissed the appeal of the company, and on June 14 the city renewed its efforts to obtain a writ of peremptory mandate. A similar case is pending in the Supreme Court.

Labor for War Industries

Only Those Employing More Than 100 Must Obtain Unskilled Workers from Government

The Department of Labor announced on July 8 that only manufacturers engaged on war contracts and employing more than 100 workers will be required to obtain their unskilled labor through the United States Employment Service of the Department of Labor by the ruling which goes into effect on Aug. 1. So much uncertainty as to the scope of the new labor recruiting policy has been shown in inquiries received by the Department of Labor from employers not engaged in war work that the department announced on July 8 the exceptions under which private recruiting of labor may still be carried on. The announcement follows:

NON-WAR INDUSTRIES AFFECTED INDIRECTLY

"Non-war industries are affected only indirectly. But they are one and all affected indirectly, from the fact that the war industries of the nation are now of paramount importance, demanding sacrifice and co-operation from all employers not engaged in war work in order that they may function with maximum efficiency.

"Non-war industries, therefore, must not offer superior inducements, prevent the transfer of workers urgently needed for war production, or in any way attempt to compete with the government for labor.

"The following five classes of labor need not at the present time be recruited through the United States Employment Service, although, of course, the machinery of the Employment Service is available to all employers needing these classes:

"1. Labor which is not directly or indirectly solicited.

"2. Labor for railroads, (except in so far as the Director General of Railroads has already or may in the future require that recruiting shall be exclusively through the United States Employment Service.)

"3. Farm labor—to be recruited in accordance with existing arrangement with the Department of Agriculture.

"4. Labor for non-war work.

"5. Labor for establishments the maximum force of which (including the additional number recruited) does not exceed 100 employees."

COMMUNITY LABOR BOARD ESTABLISHED

The establishment of community labor boards to have general jurisdiction over the recruiting and the distribution of labor, in co-operation with the United States Employment Service is announced.

These boards will localize in each industrial region the enforcement of the policies of the United States Employment Service. In the mobilization of the army of producers, they will apply the federal policies as the draft boards put into operation the selective

conscription act. In order that the boards may represent adequately their communities employees and employers will each select representatives.

Community labor boards consisting of one representative of employers and one representative of employees with a third representative of the United States Employment Service are being established wherever the industrial situation justifies it.

The members of the boards will be appointed by the state directors of the United States Public Service Reserve. Chambers of Commerce and manufacturers' associations will be asked to nominate industrial management representatives; state and city federations of labor will nominate the labor members, while the third member who will be the presiding officer must in every case be a representative of the United States Employment Service.

The community labor boards will assist in mobilizing the labor of their respective communities, but especially they will decide upon the relative needs of local establishments seeking labor, and where the supply is less than the demand they will prorate the existing reserve.

Short Strike on Norfolk & Bristol

A strike for increased wages took place on the Norfolk & Bristol Street Railway, Foxboro, Mass., from June 20 to 22. In April the company advanced the wages of its employees 2 cents an hour, establishing a scale of 23 to 32 cents depending upon length of service. Recently the employees demanded a sliding scale of 35 to 40 cents an hour. The company offered an advance of 6 cents an hour. The men refused this increase and called a strike. The company made no attempt to operate cars during the period of cessation of work. The men returned to work on June 22. The present scale of wages ranges from 32 to 37 cents an hour, representing an advance of 29.6 per cent over the payroll of last winter. Twenty-eight uniformed men are employed by the company.

Ordered to Take Men Back

The State Board of Arbitration, of Minnesota has directed the Twin City Rapid Transit Company, Minneapolis, to reinstate desirable men within thirty days. The men referred to were "locked out" last November for failing to comply with the order that prohibited them from wearing union buttons while on duty. The arbitration order reads:

"Men desiring re-employment to file applications with the company within twenty days.

"As vacancies occur, the company shall re-employ desirable men and in cases of dispute same to be submitted to the State Board of Arbitration for

adjustment, and all desirable men who seek re-employment shall be re-employed, within such reasonable time as the State Board of Arbitration shall determine, at least 100 within thirty days, and the balance at the rate of 100 a month as vacancies occur, and no other trainmen to be employed by the company until the list of desirable men has been exhausted.

"Rate of pay to be based on experience to the extent that men seeking re-employment who have had at least one year's experience with the company will be started at the rate of pay applying to their length of service, with a maximum wage obtaining during the third year of service."

Representative of the trainmen at a preliminary hearing before the board said 975 men were "locked out" by the company last October and asked reinstatement for about 600 who still desired to return. A representative of the railway estimated, however, that not more than 700 men left the employ of the company at that time.

Help Scarce in Kansas City

The problem of labor is being tackled constantly by the Kansas City (Mo.) Railways in new ways. Recently, the company secured the co-operation of the enlisting officers of the Army, Navy, and Marine Corps. Notices were posted in each recruiting station, as follows:

"Positions for Rejected Men. Rejected men may secure employment in agreeable outdoor work as conductor and motormen by making personal application to the superintendent of employment. Kansas City Railways."

British Columbia Men Strike

All the employees who come under the agreement between the British Columbia Electric Railway, Ltd., Vancouver, B. C., and the street and electric railway employees union went on strike on the morning of July 2. The electrical workers also quit, thereby suspending operation on two of the interurban lines, the employees of which come under the agreement with the Brotherhood of Railway Trainmen.

Not a wheel was turned on the system in Vancouver or at Victoria on July 3. The power plants are continuing to provide current for the light and power circuits, but no current is being furnished for the railways.

The railwaymen went out without waiting for the report of the conciliation board. This was expected to be rendered in a day or two. The agreement of the men lapsed on June 30 and they continued to work on July 1, Dominion Day, which is a holiday. The electrical workers, some time ago, refused an offer of arbitration and the government chose an arbitrator for them. This board began its sessions on July 2.

In the meantime, jitneys, which were ruled off at the end of June, are continuing to operate, but have raised their fares to 10 cents.

Labor Hearings in New York

As this issue of the *ELECTRIC RAILWAY JOURNAL* went to press on July 12, hearings were being held at the Federal Building, New York, before the War Labor Board in regard to the labor problems up for settlement on the railway lines of the Public Service Corporation of New Jersey, Newark, and in the cities of Rochester, Buffalo and Schenectady. The indication was that the hearings would be adjourned pending the submission of briefs and the holding of the next Washington hearing on July 22. It was announced that the hearing in regard to the Chicago surface and elevated lines would be held in Chicago on July 13.

Recently developed street railway controversies in the cities of Omaha, Neb., Columbus, Ohio, New Orleans, La., and Buffalo, have been referred by the National War Labor Board to the joint chairmen, William H. Taft and Frank P. Walsh, who, as a section of the board, have charge of all of the electric railway disputes before the board, now twenty-eight in number.

In the Omaha matter, the Omaha Street Railway has so far refused to submit to the board's jurisdiction. In advance of further action, the board has decided to direct the officers of the company to appear in Washington to explain their position.

ago by which the city could have purchased the property at its physical valuation, the worth to have been fixed by a condemnation board, and to have paid for it in yearly installments.

Conference With Boston Men Soon.—Matthew C. Brush, president of the Boston (Mass.) Elevated Railway, and Louis A. Frothingham, chairman of the board of trustees of the company, conferred on July 1 with the representatives of the employees in regard to the demands recently presented by the union for an increase in wages to 60 cents an hour for motormen and conductors, and proportionate increases for other classes of employees. Mr. Brush informed the union representatives that owing to the press of business before the board the members would probably not be able to reply to the demands of the union until July 15.

New Orleans Labor Differences Settled.—Committees representing the union and the New Orleans Railway & Light Company, New Orleans, La., on June 26 amicably settled all points in dispute, with one exception. Although no statement has been made by either side as to the terms of the new wage contract, it is known that each side made concessions. The men asked for an increase in wages from 24½ cents to 45 cents an hour. The company offered 31 cents an hour. It is understood that this point was disposed of by both sides agreeing to accept the finding of the War Labor Board with respect to a living wage.

Has Confidence in Commission.—Governor Edge of New Jersey will not call a special session of the New Jersey Legislature to have enacted legislation which will prevent the Board of Public Utilities Commissioners from modifying the terms of utilities contracts and public utilities now regulated by ordinance, as demanded by George L. Record, who assisted in representing the municipalities of the State in opposition to recent petitions for increases in fares of the electric railways. In reply to Mr. Record's letter the Governor said he believed that the commission could be trusted to safeguard the interests of the public and that he would be "culpable were he yield to hysteria" and convene the Legislature.

Franchise Negotiations in Vancouver.—It has been tentatively agreed by the City Council of Vancouver, B. C., and George Kidd, general manager of the British Columbia Electric Railway, to arrange for a two months' extension of the existing franchise that the company holds. This extension is intended primarily to allow sufficient time for the city and company to enter into negotiations which will have as their object the substitution of a reasonable and workable grant for the present antiquated and obsolete franchise agreement. It has been intimated, but by no means authoritatively stated, that under the coming five-year term the railway might be operated under dual control by a joint commission under a service-at-cost arrangement.

New Working Contract in Portland.—The trainmen of the Portland Railway, Light & Power Company, Portland, Ore., have ratified the proposed new contract with the company, with the exception of the increased wage scale provision. It has been agreed by both sides to submit this matter to the National War Labor Board. Both parties have agreed to abide by the decision of the board. Touching working conditions, the contract differs but little from that formerly in effect, but calls for a marked increase in the wage scale. F. T. Griffith, president of the company, has advised the men that the increase could not be granted under the present 6-cent fare. The present wage scale follows: First year, 38 cents; second year, 40 cents; thereafter, 45 cents; the proposed scale follows: First year, 53 cents; second year, 55 cents; thereafter, 60 cents.

Near-Strike on the Pacific Electric.—At noon on July 2 platform men of the Pacific Electric Railway, Los Angeles, Cal., notified Paul Shoup, president of the company, that unless certain demands were granted they would walk out at 7 p. m. of the same day. Mr. Shoup stated that he could not grant the demands and would not treat with the union as such although he would gladly discuss conditions with the men themselves. At 7 p. m. platform men left their cars at the carhouses or terminals and quit. After night sessions held separately by representatives of the union and the company, with mediators, the men were advised by the union to return to work the next morning. This they did. The company allowed them to take their old positions and by mid-forenoon service was fully restored. The differences were to be discussed further on July 10.

Program of Meeting

Central Electric Railway Association

The program has been announced for the meeting of the Central Electric Railway Association to be held at Cedar Point, Ohio, on July 17-18. The executive committee will meet at 10.30 a. m. on July 17. At 2.30 p. m. that day there will be a meeting of the Central Electric Railway Accountants' Association, with a business session and reports of committees. Following this there will be an address by H. O. Bentley, general attorney of the Western Ohio Railway, Lima, Ohio. The meeting of the association on July 18 will convene at 9.30 a. m., with a business session and reports of committees. Following this Britton I. Budd, president of the Metropolitan West Side Elevated Railway, Chicago, Ill., and a member of the War Board of the American Electric Railway Association, will present a paper, "Field of the Interurbans." H. A. Nicholl, general manager of the Union Traction Company of Indiana, Anderson, Ind., will present a paper, "Electric Railways and Their Labor." Both of these will be discussed by members of the association.

News Notes

Electricians Tie Up Butte System.—The Butte (Mont.) Electric Railway was tied up on June 24 by a strike of the electrical workers, who quit their posts at the substations and shut off power throughout the city. Motormen and conductors are not on strike and have no grievance.

Increases in Wages in Fort Wayne.—Announcement was made on July 1 by the Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind., that an increase in wages would be granted to its motormen and conductors on the city lines in Lafayette, Logansport, Peru and Wabash. The new rate will be as follows: First six months, 26 cents an hour; second six months, 27 cents an hour; after the first year, 29 cents an hour; and after the second year, 30 cents an hour. Operators on one-man cars will be paid 3 cents an hour additional.

M. O. Negotiations Again Reported.—At the suggestion of Mayor Marx the Street Railway Commission of Detroit, Mich., will probably enter into negotiations with the Detroit United Railway for the purchase of the property of the company. It is said that the commission hopes to obtain an agreement somewhat similar to that voted down by the people several years

Financial and Corporate

Still Going Up

Comment on Interest Return of Kansas City and Boston Financing Just Announced

Announcements made during the past week of large financial operations show how the borrowing rates, particularly for public utilities, as indicated by the return to the investor, are constantly going up. These announcements concern the Kansas City Railways and the West End Street Railway. The first is a short-term operation, while the second is for a long term. Both bear interest at 7 per cent. In the case of Kansas City the return to the investors is 7.75 per cent. The offering terms to the investors in the case of the West End issue have not been announced. A feature that both issues have in their favor is public control agreements. In one case this is lodged with the city and in the other with the State. In other words, the securities are supported by agreements drawn in accordance with the best thought from the standpoint of the companies and the political subdivisions in which the companies operate.

The Kansas City offering is \$7,750,000. It consists of three-year gold notes secured by pledge of the company's first mortgage bonds bearing 6 per cent interest to the extent of more than 30 per cent in excess of the note issue. The first mortgage 5 per cent bonds of the company when offered for subscription about three years ago sold at 98. The New York Times commented on this offering as follows:

"What appears to be a record in high yield for an offering of public securities of a reasonably substantial character, at least for recent months, is made by the three-year 7 per cent collateral trust notes of the Kansas City Railway of which Halsey, Stuart & Company, the Continental & Commercial Trust & Savings Bank, and the New England National Bank of Kansas City are offering \$7,750,000 at a price to yield upward of 7.75 per cent. The recent refunding offerings of public utilities, such as the Brooklyn Rapid Transit, New Orleans Railway & Light, and others, have been on a straight 7 per cent basis. The Kansas City Railways, moreover, has already won its fight for a 6-cent fare, which the others have not."

An issue of bonds of the West End Street Railway, Boston, to the amount of \$1,581,000, was authorized by the Public Service Commission on June 6. The bonds are to be issued for the purpose of refunding an equal amount of three-year bonds issued on Aug. 1, 1915, are to be payable in thirty years from date, and will bear interest at a rate not exceeding 7 per cent. Of this latter provision of its order the commission says:

"Since the interest on these bonds, under the provisions of chapter 159 of the special acts of 1915 (the Elevated public control act) will in effect be guaranteed by the Commonwealth for at least ten years, the commission has been in doubt whether an interest rate of 'not exceeding 7 per centum per annum' ought to be approved, as required in the petition. We have been advised, however, by the public trustees who have been appointed to manage and operate the Boston Elevated Railway (the lessee of the West End Street Railway) under the provisions of the aforementioned special act, that they desire such approval, believing that it might be impossible to market the bonds under present conditions if the maximum interest rate were fixed at a lower point."

Paducah Companies Default Interest

Charles K. Wheeler, chairman of the board of the Paducah Traction Company and the Paducah Light & Power Company, the securities of which are owned by the Paducah Traction & Light Company, Paducah, Ky., has announced that interest due on July 1 on the bonds of the Paducah Street Railway and the Paducah City Railway has not been paid. Committees representing the holders of the bonds on which interest is in default have been organized and they have issued a statement urging the bondholders to turn in their securities to these committees so that concerted action may be taken for the bondholders' interests. The Paducah Street Railway has outstanding \$60,500 of first sinking fund 6 per cent bonds and \$98,000 of first mortgage 6 per cent bonds, the Peoples Light, Power & Railway Company has outstanding \$98,500 of first mortgage 6 per cent bonds, the Paducah City Railway has outstanding \$238,000 of consolidated first mortgage 5 per cent bonds, and the Paducah Traction & Light Company has outstanding \$599,000 of first mortgage collateral trust 5 per cent bonds. The Paducah Traction & Light Company has outstanding \$500,000 of 5 per cent cumulative preferred stock and \$1,000,000 of common stock.

Kansas Short Line Sold

The Leavenworth & Topeka Railway, a steam road 46 miles long, has been sold to business men along the line who are required by the court to run the road. The company organized by the purchasers has leased the road to a group which is organizing the Topeka & Eastern Railway, which O. P. Byers, Hutchinson, Kan., will control. The public and, it is said, the owners and operators, expect that the road will ultimately be electrified.

Milwaukee 1917 Returns

During Last Year Operating Increases Absorbed More Than 90 Per Cent of Revenue Gains

The operating revenues of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., for the calendar year 1917 showed a gain of \$1,007,040 or 14.47 per cent as compared with the preceding year. The railway department operating revenues increased \$340,959 or 7.39 per cent. The generally higher costs of materials and labor and the larger reserves for taxes, however, absorbed 90 per cent of the increase in operating revenues.

As a result the gross income showed an increase of \$130,580 or 6.2 per cent. The interest charges rose \$171,968 or 22.6 per cent, and the net income decreased \$41,388 or 3 per cent. After the payment of \$270,000 in preferred dividends as in 1916, and \$1,034,250 in common dividends, as compared to \$1,058,875 in 1916, the 1917 surplus totaled \$1,969, as compared to \$18,732 in 1916. Full details are given in the accompanying statement.

The appropriations for maintenance and depreciation of physical property, in percentages of the operating revenues of the various utilities, were as follows: Railway, 18.81 per cent; electric light and power, 13.72 per cent, and heating, 12 per cent. The balance of these appropriations remaining after providing for maintenance is carried to the credit of depreciation reserve. The appropriations were reduced during 1917 to the percentages shown, pending the authorization by the Wisconsin Railroad Commission of adjustments in rates and service standards which would produce a reasonable return upon the fair measure of the utility capital used in the service of the public.

The expenditure during the year for additions, extensions and betterments to the plants and systems, other than the purchase of property of the Commonwealth Power Company and allied companies referred to in the last year's report, amounted to \$2,328,404. Of this amount \$1,222,493 is chargeable to the railway; \$1,079,605 to the electric utility, and \$26,305 to the heating utility. The value of property replaced or abandoned and charged to the depreciation reserve during 1917 was \$61,048.

REGULATION IS Ponderous

In commenting upon some of the problems confronting utilities in these war days, President James D. Mortimer says:

"The city of Milwaukee has shared to a large extent in the increased industrial activity which accompanied the entry of the United States into the war. The large volume of new and profitable business which the various establishments in the city have obtained has made possible the adoption of rates of wages in other industries with which, because of its already serious burdens, the Milwaukee Electric Railway & Light Company has found impossible to compete successfully, though wage increases

of greater magnitude than the present rates of fare justify have been granted. The operating organization has held together very well under all the circumstances.

"The regulation of public utilities as at present practiced is too ponderous and slow to give to the utilities and investors the protection originally intended. Near-bankruptcy has to be shown before relief can be obtained. Regulation is a problem of the future, and so far its conclusions have been predicated on what has happened rather than what is almost certain to occur. The experience of the last several years proves fairly conclusively that the regulation of public utilities in private ownership can remain a permanent part of our economic scheme only if it is made automatic and recognizes the desirability of higher rates of return

Reports from Six Large Roads

Statistics for 1918 Show Increased Traffic Was More Than Counterbalanced by Increased Expenses

In the March 30 issue of the JOURNAL there appeared some electric railway statistics, being a comparison of the returns for the calendar years 1916 and 1917 of a number of companies throughout the country made by the statistical bureau of the American Electric Railway Association. A total of 8437 miles of line was represented in the data given, and an interesting showing was made of the effect of rising costs of supplies and labor on the net revenues.

A study of the annual reports of a few of the larger properties in the

ating ratio indicated an increase of 3.8 per cent in expenses, including taxes and depreciation. The rapid transit lines showed a rise of 8.3 per cent in gross and 1.8 in operating percentage. The fact that only one of the latter companies felt the depressing effects of the full calendar year is brought out strikingly in this more favorable showing.

There was an increase in revenue passengers and total passengers hauled on all the systems referred to. Under this item the difficulty of comparison begins with the absence of figures on free passengers on five properties and the lack of data on transfer passengers on three systems. Whether these companies keep a record of such riders for their own purpose does not appear, but the advisability of making such an estimate must be evident to all operators, because free passengers enter into the cost of service the same as any other class of patrons. It is not likely that any large company has an exact figure on free riders because of the impossibility of counting all persons in uniform or those who present passes which are not recorded on the register. The fact remains, however, that a fairly close estimate is made by those who endeavor to keep such records, and the figures must serve a purpose which makes the effort and cost worth while.

To take the figures as they stand, with due allowance for items which are missing, it is evident that there was an increase of 3.1 per cent in the "total passengers per mile of single track" on surface lines, where the totals ranged from 655,037 to 1,264,694. On rapid transit lines there was a decrease of 7 per cent, the figures ranging from 1,192,064 to 3,261,370. In this connection, as under other items where comparisons are made, it must be kept in mind that three of the systems classed as rapid transit include the statistics of surface lines operated by the same company. No segregation of data has been made in such cases.

SPEED REMAINS PRACTICALLY CONSTANT

Revenue car-miles and revenue car-hours increased in relative proportion on all twelve properties, and as a result the average speed in miles per hour remained practically constant. The student who seeks to get the "average speed" from other properties will find that this item is given on a different basis in different cities, because some operators take the speed as indicated by time-tables, while others arrive at the figure by dividing car-miles by car-hours. Here, too, the person making the comparison must know whether trail car statistics are included in any of the cities referred to and whether the car-hours include all hours paid for, such as lay-over time.

An interesting study of car performance may be made from the figures showing "annual miles operated per car." This is an index of the use of rolling stock. The data at hand show that there was no appreciable change in the average during two years. This

COMPARATIVE INCOME STATEMENT OF MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY FOR CALENDAR YEARS 1916 AND 1917

	1917		1916	
	Amount	Per Cent	Amount	Per Cent
Operating revenues—railway.....	\$4,953,356	62.2	\$4,612,397	66.2
Operating revenues—light, power and steam heat.....	3,014,835	37.8	2,348,754	33.8
Total operating revenues.....	\$7,968,192	100.0	\$6,961,151	100.0
Railway operating expenses:				
Way and structures.....	\$ 230,748	2.9	\$ 209,985	3.0
Equipment.....	285,601	3.6	200,496	2.9
Traffic, power, transportation.....	2,095,297	26.3	1,704,279	24.6
General.....	131,235	1.6	139,251	2.0
Undistributed.....	288,883	3.6	328,540	4.7
Depreciation (reserve credit).....	401,412	5.1	593,091	8.5
Contingencies (reserve credit).....	.....	.....	1,000	0.0
Taxes (reserve credit).....	346,959	4.3	289,738	4.1
Total railway operating expenses.....	\$3,780,139	47.4	\$3,466,480	49.9
Operating expenses—light, power and steam heat.....	2,058,598	25.8	1,464,844	21.0
Total operating expenses.....	\$5,838,738	73.3	\$4,931,324	70.9
Net operating revenues.....	\$2,129,454	26.7	\$2,029,827	29.1
Non-operating revenues.....	108,127	1.3	77,173	1.1
Gross income.....	\$2,237,581	28.0	\$2,107,000	30.2
Interest charges.....	931,361	11.7	759,393	10.9
Net income.....	\$1,306,200	16.3	\$1,347,607	19.3
Dividends on preferred stock.....	270,000	3.4	270,000	3.8
Dividends on common stock.....	1,034,250	12.9	1,058,875	15.2
Surplus.....	\$ 1,970	0.0	\$ 18,732	0.3

on utility capital with a rising commodity price level."

The scope of activities of the Employees' Mutual Benefit Association has been considerably enlarged and during the summer of 1917 the Employees' Mutual Benefit Association Food League was organized to encourage and assist the members of the association to cultivate practically all of the vacant property of the company within the city limits. Under the direction of a committee food supplies are distributed at cost to the members.

Miscellaneous statistical data of the company follow:

	1917	1916
Receipts per mile of track operated.....	\$27,460	\$25,594
Revenue passengers carried.....	115,626,143	107,528,091
Transfer passengers carried.....	47,232,242	44,655,506
Per cent transfer to revenue passengers.....	40.85	41.54
Receipts per revenue passenger.....	\$0.0425	\$0.0425
Revenue car-hours operated.....	1,862,456	1,772,573
Receipts per revenue car-hour.....	\$2.66	\$2.60
Revenue car-miles operated.....	16,670,189	15,899,284
Receipts per revenue car-mile.....	\$0.2971	\$0.2901

United States brings out some other points of comparison which should have a value to railway men, especially when taken in connection with the more detailed statistics already mentioned. The reports in question are those of six city surface lines and six rapid transit systems, representing a total of about 2300 miles of line. While all these figures have been made public recently it must be kept in mind that only four of the surface line companies and one of the rapid transit roads had their fiscal years ending in December, 1917. The other companies, therefore, did not feel the full effect of twelve months of war conditions. The twelve properties under consideration cannot be identified in this comparison except to say that each represents a gross annual business of \$5,000,000 or more.

GROSS EARNINGS INCREASED MORE ON RAPID TRANSIT THAN ON SURFACE

To consider first the gross earnings of the surface companies, it appears there was an increase of 3 per cent over the preceding year, while the oper-

average last year on surface lines was 36,375, while on rapid transit lines it was 41,840 miles.

"Car-miles per mile of single track operated" is an item which may be taken as an index to the density of service. The surface companies showed an increase of 1.8 per cent with figures ranging from 87,550 to 117,302. The rapid transit systems showed a slight decrease, their extreme figures being 111,759 and 580,093 in the past year.

NET DECREASE PER CAR-MILE AND PER CAR-HOUR

There comes next the story of decreasing net and the struggle against rising costs as told in the items "transportation revenue per car-mile and car-hour" and "expenses per car-mile and car-hour." These in brief follow:

STATISTICS PER CAR-MILE FOR SIX LARGE ROADS					
Per Car-Mile		Surface Lines		Rapid Transit	
Transportation revenue.....		2.1 per cent increase		6.1 per cent increase	
Average for 1917.....		28.4 cents		27.6 cents	
Expenses.....		14 per cent increase		9.7 per cent increase	
Average for 1917.....		21.4 cents		16.9 cents	
Per Car-Hour					
Transportation revenue.....		No change		No change	
Average for 1917.....		\$2.56		\$3.38	
Expenses.....		4 per cent increase		12 per cent increase	
Average for 1917.....		\$1.87		\$2.13	

Massachusetts Line to Be Scrapped

The Warren & Spencer Street Railway, Spencer, Mass., is to be torn up and sold for junk by the Swift-McNutt Company, Boston, Mass., which is now wrecking the Ware & Brookfield Street Railway in the same district. John F. Lambert, representing the Warren & Spencer Company at Ware, Mass., stated to the press that wrecking work would start at the West Warren end of the road at once. The property consists of 22 miles of track, 10 cars, a power plant and carhouse at Brookfield. The road connects with the Worcester Consolidated Street Railway at Spencer.

Georgia Road Suspends.—Operation has been discontinued by the Clarkesville (Ga.) Railroad.

Florida Road Suspends.—Service has been suspended on the line of the San Jose Traction Company.

Part of Line Suspends.—Operation has been discontinued by the Oak Bluffs (Mass.) Street Railway on its line between Oak Bluffs and Tisbury.

Indiana Road Being Dismantled.—The Cincinnati, Bluffton & Chicago Railroad, Huntington, Ind., which was sold at receiver's sale in September, 1917, is being dismantled.

Foreclosure Sale July 25.—July 25 has been set as the date for the sale of the property of the Central Crosstown Railroad, New York, N. Y., under foreclosure. The New York Railways, which is now operating the road, is expected to be the purchaser. Foreclosure proceedings against the Central Crosstown Railroad were instituted because of a default of principal and interest under the company's first consolidated mortgage.

Action on Dividend Put Over.—Henry A. Blair, chairman of the board of the Chicago (Ill.) Railways, says: "The board at its meeting on July 2 did not pass the dividend on Series 1, and the matter may be brought up later. Under present conditions and pending the decision of the War Labor Board at Washington, it was thought best to defer the matter to a future meeting. The company has earned and will pay all its interest obligations due on Aug. 1 as usual."

Car Trust Formed.—The Car Trust Equipment Company, Indianapolis, Ind., has been formed with a capital of \$225,000 by officers of the Indianapolis Traction & Terminal Company to build thirty cars to be used in Terre Haute, Ind., by the Terre Haute Traction & Light Company, controlled by the Terre Haute, Indianapolis & Eastern Traction Company. The incorporators of the company are: Robert I. Todd, president of the Terre Haute, Indianapolis & Eastern Traction Company; John J. Appel, vice-president; and Joseph A. McGowan, secretary-treasurer of that company.

Protective Committee for New Orleans.—A bondholders' protective committee has been formed to look after the interests of all holders of bonds of the New Orleans, Railway & Light Company, New Orleans, La., and its subsidiary companies. The step was taken because the company failed in the payment of the semi-annual installment of interest due on July 1 on its general mortgage 4½ per cent gold bonds and also in the payment in the installment of interest due on that date on the bonds of certain of its subsidiary companies and in view of the uncertain conditions now surrounding the property. The committee, of which R. S. Hecht is chairman, invites the co-operation of all holders of bonds of the companies. Bernard McClosky and Walter B. Spencer are counsel for the committee.

Electric Railway Monthly Earnings

ATLANTIC SHORE RAILWAY, SANFORD, ME.

Period	Operating Revenue	Operating Expense	Operating Income	Fixed Charges	Net Income
1m., May, '18	\$17,225	\$10,572	\$6,653	\$475	\$6,178
1m., May, '17	14,865	12,938	1,947	431	1,516

AURORA, ELGIN & CHICAGO RAILROAD, WHEATON, ILL.

1m., Apr., '18	\$156,937	\$138,884	\$18,053	\$35,892	\$17,839
1m., Apr., '17	163,746	\$116,957	46,789	35,642	11,147
4m., Apr., '18	596,346	\$549,043	47,303	143,291	95,988
4m., Apr., '17	633,263	\$469,322	163,741	143,088	20,653

CHATTANOOGA RAILWAY & LIGHT COMPANY, CHATTANOOGA, TENN.

1m., May, '18	\$147,806	\$115,601	\$32,207	\$31,317	\$890
1m., May, '17	117,840	\$78,387	39,453	30,048	9,405
12m., May, '18	1,531,816	\$1,315,437	216,379	365,386	\$149,207
12m., May, '17	1,282,020	\$897,275	384,745	352,387	27,358

COLUMBUS RAILWAY, POWER & LIGHT COMPANY, COLUMBUS, OHIO

1m., May, '18	\$350,814	\$242,017	\$108,797	\$55,789	\$53,008
1m., May, '17	316,274	\$223,357	92,917	47,109	45,808
12m., May, '18	4,192,179	\$3,106,703	1,085,476	607,378	478,198
12m., May, '17	3,715,866	\$2,398,038	1,317,828	527,138	790,690

COMMONWEALTH POWER, RAILWAY & LIGHT COMPANY, GRAND RAPIDS, MICH.

1m., May, '18	\$1,709,860	\$1,125,780	\$584,080	\$502,430	\$81,650
1m., May, '17	1,512,014	\$931,921	580,093	437,257	142,836
12m., May, '18	20,509,341	\$13,520,164	6,989,177	5,569,903	1,419,274
12m., May, '17	17,919,035	\$10,366,987	7,552,048	5,103,594	2,448,454

GRAND RAPIDS (MICH.) RAILWAY

Period	Operating Revenue	Operating Expense	Operating Income	Fixed Charges	Net Income
1m., May, '18	\$105,683	\$81,621	\$24,062	\$19,287	\$4,775
1m., May, '17	107,618	\$77,355	30,263	18,174	12,089
12m., May, '18	1,287,722	\$934,539	353,183	226,326	126,857
12m., May, '17	1,306,964	\$865,665	441,299	205,206	236,093

LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY, LEWISTON, ME.

1m., May, '18	\$73,099	\$61,002	\$12,097	\$18,445	\$16,348
1m., May, '17	71,822	\$56,988	14,834	15,636	1802
12m., May, '18	875,096	\$732,724	142,372	197,576	\$55,204
12m., May, '17	842,493	\$612,659	229,834	185,102	44,732

NASHVILLE RAILWAY & LIGHT COMPANY, NASHVILLE, TENN.

1m., May, '18	\$232,266	\$149,160	\$83,106	\$40,514	\$42,592
1m., May, '17	198,301	\$136,260	62,041	40,539	21,502
12m., May, '18	2,522,800	\$1,612,342	905,258	489,350	415,908
12m., May, '17	2,427,202	\$1,526,388	900,614	499,167	401,447

12m., May, '18	16,683,263	\$4,288,918	12,394,347	\$1,031,759	\$1,360,588
12m., May, '17	5,782,875	3,279,012	2,503,863	941,835	1,562,028

PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.

1m., May, '18	\$620,294	\$1369,387	\$250,907	\$187,684	\$62,223
1m., May, '17	474,433	\$265,308	209,125	177,102	32,023
12m., May, '18	6,676,191	\$14,065,109	2,611,082	2,144,632	466,450
12m., May, '17	5,647,205	\$9,057,131	2,590,074	2,178,108	411,966

* Includes taxes. † Deficit. ‡ For the month \$18,611, and for twelve months, \$271,459 included for depreciation

Traffic and Transportation

B. R. T. Wants Seven Cents

Application to Board of Estimate Shows Company Would Also Charge Two Cents for Transfers

A petition from the New York Consolidated Railroad requesting permission to charge a 7-cent fare on the new Brooklyn Rapid Transit Company subways was filed with the Board of Estimate on July 10. The communication pointed out that parts of the new lines have already been operated with financial success, but prospective deficits are mentioned, as follows:

"There seems to be no reasonable doubt that, upon the completion of the railroads which your petitioner is to operate, the combined system will be earning its full preferentials and yielding revenue to apply on the city's interest and sinking fund.

"From the time that initial operation begins any deficits in meeting these city charges can no longer be added to the cost of construction, as at present, but must be raised by taxation.

WANTS BURDEN SHIFTED

"In view of the city's present financial condition and the burdens on taxpayers entailed by the war, the question is submitted for consideration of your honorable board whether temporarily at least it would not be to the city's interest to shift the burden of this interest cost from the taxpayers to the fare payers by increasing the rate of fare chargeable under the contract. An addition of 2 cents to the fare would probably make the revenue sufficient to meet the city's interest immediately after full operation begins. We would not urge this except as a temporary measure justified by the unforeseen delays in completing rapid transit lines, the effect of the war conditions upon net revenue and the undesirability of increasing the burdens of taxation at the present time.

"Moreover, such a measure would place a large part of the cost of rapid transit upon the hundreds of thousands of persons making up the transient population of our city, who pay no local taxes or rent and who get their transportation at less than cost. In case this suggestion should meet with your approval, we should be pleased to take up with you and the Public Service Commission for the First District the preparation of a supplementary amendatory contract."

SURFACE LINES ALSO INCLUDED

There was a second petition from the surface lines allied with the Brooklyn Rapid Transit System asking that a 7-cent fare be permitted on these routes as well. This communication pointed out that the companies might be forced

to go back to the zone system of fares, said to be authorized by the franchises, unless the aid now sought is realized. Under the zone plan, it was noted, fares would be doubled and in some instances advanced even beyond that point. In this connection the company said:

"Instead of applying the rates which we are advised we have the right to charge, we prefer to solicit your approval to the following arrangement, to continue during the war and thereafter (not less than one year) until it shall be terminated by the action of your board or by the Public Service Commission for the First District, to wit:

"1. A unit charge of not exceeding 7 cents for one continuous ride upon any line of each petitioner company except to and from Flushing, North Beach and Coney Island, where the present fare [10 cents] will prevail.

"2. Each passenger paying a cash fare of 7 cents to be entitled for an additional 2 cents to a transfer ticket to any intersecting line, either of the company issuing such ticket or of any of the other undersigned companies. Such transfer to be subject to reasonable rules as to use. No transfer to be required to be issued on a transfer.

"Shall we go back to the zone system, as we are authorized to do by our franchises, relieving it of such of its extreme hardships as might be possible? We prefer not to unless there is no other way open. This would mean wholesale increases of fares."

Boston Fare Increase Coming

Within a few days an official announcement of their plan of action is expected from the trustees of the Boston (Mass.) Elevated Railway. In a preliminary statement issued on July 9 in their behalf it is pointed out that the estimated increase in the cost of operation, making no allowance for higher cost of materials, greater income taxes, better standard of maintenance, or for increase in wages to employees, amounts to more than \$4,200,000, while a 1-cent raise in fare would produce only \$3,650,000, assuming that as many cash passengers ride in 1918 as in 1917.

In the first five months this year, according to the statement, there has been a deficit, below fixed charges, of \$233,719. Among new items of expense is \$475,000 rental for the Dorchester tunnel.

After mentioning a "request from the employees for a substantial increase," the statement goes on to show that a raise of 1 cent an hour in pay would add \$250,000 to expenses, and it is added that the trustees "will have no option in the immediate future than to make a substantial increase in fares."

Richmond Hearing Begun

Council Committee Begins Higher Fare Sessions—Calls for More Fare Data from the Company

Advocates of the proposed increase to a straight 5-cent fare on the lines of the Virginia Railway & Power Company, Richmond, Va., presented their arguments in favor of the measure at the meeting of the committee on streets of the Council on June 27. Further consideration was deferred until July 8, when it was proposed to hear opponents of the measure.

In addition to the figures already presented, officials of the company were requested to submit the following data:

1. The amount of the gross revenues with the straight 5-cent fare in effect.

2. What per cent the city will receive on the present tax basis, and on a straight 5-cent basis.

3. The amount of gross revenues with the straight 5-cent fare, provided that workmen's tickets be sold at the rate of six for a quarter, the school tickets remaining at 2½ cents, remitting the city tax on school tickets.

E. Randolph Williams, general counsel, presented the case for the company. He stated that he felt it was unnecessary to explain that with the cost of labor and maintenance increasing by leaps and bounds it was absolutely impossible for the company to maintain the efficiency of its service under present conditions. He produced figures to show that in some cases, the cost of material had increased recently from 60 to 400 per cent and that the increase in wages has been even greater.

Atlanta Fare Case Concluded

Arguments on the petition of the Georgia Railway & Power Company, Atlanta, Ga., to increase its rates generally, were concluded before the Railroad Commission of Georgia on June 28. The case was taken under advisement. Attorneys had until July 2 to file reply briefs to the arguments.

Counsel for the so-called people's committee, which is opposing the petition, in concluding his case, made the point that the courts alone can decide as to whether the company can increase its fare from 5 cents to 6 cents, predicating the statement upon a contract alleged to have been made by the company and the city of Atlanta in 1902 by which the company, he claimed, agreed to charge at that time, and in the future, a fare of 5 cents.

Attorney Rosser for the company argued that it is the duty of the Railroad Commission to fix just and reasonable rates to meet present-day conditions as the commission found them; that it had been proved that the company could not do business under present war-time price conditions, under the present rates, and that it was merely a matter of permitting this company to carry on its operations and make its improvements, or to throttle it.

Montreal Fares Increased

Commission Appointed Under Recent Franchise Settlement Does Away With Tickets and Will Charge for Transfers

The Montreal Tramways Commission has announced the fares which will obtain for the next year on the lines of the Montreal (Que.) Tramways. The new rates will come into effect eight days after publication of an advertisement for two days in an English and a French newspaper of the city. This is expected to be between July 15 and Aug. 1.

The new rates apply to the lines both inside and outside the city, but it is to the city fares perhaps that most interest attaches. In the so-called uniform tariff or city territory citizens will pay in the day time 25 cents for five tickets, and 1 cent extra for transfers except from 5 to 8 o'clock in the morning when transfers are free. The fare after midnight will be 15 cents cash. The cash fare from 8 a.m. until midnight will be 6 cents and an additional cent for a transfer. These fares as stated in the announcement of the commission follow:

"In the uniform tariff territory comprising the city of Montreal as it exists at present, as well as the towns of Westmount, Outremont, Verdun, St. Laurent, Mount Royal, also the territories of that portion of St. Laurent parish, and of that portion of the municipality of Cote St. Luc lying to the east of the line of the Montreal Tramways, running from Snowdon Junction to Cartierville, including the land occupied by the said line, the fares shall be:

"(a) From midnight to 5 a.m., 15 cents, cash.

"(b) From 5 a.m. to midnight, 6 cents cash, or five tickets for 25 cents.

"(c) For school children from five years to sixteen years of age, on week days only, and between the hours of 8 a.m. and 6 p.m., seven tickets for 25 cents.

"(d) Transfers shall be issued free to school children specified in clause (c) and to all passengers traveling on cars between the hours of 5 a.m. and 8 a.m., on week days only. At all other times, a transfer shall be issued to any passenger paying his or her regular fare, at a charge of 1 cent."

The Tramways Commission, in establishing the tariffs, was bound to carry out the stipulations of the contract entered into by the city of Montreal and the Montreal Tramways on Jan. 28, 1918 (ELECTRIC RAILWAY JOURNAL of Feb. 9, 1918, page 288,) and ratified by the Quebec Legislature on Feb. 9, 1918. The tariffs according to the act must give full effect to this contract.

The revenue to be derived from such tariffs are to provide tramways service at cost. The Tramways Commission, after a careful study of the expenditure incurred by the tramways in previous years and taking into consideration the increase in labor and mate-

rial, found it necessary to provide for a total revenue of approximately \$10,000,000 for the twelve months ending June 30, 1919. This gross revenue exceeds the revenue of the year ended June 30, 1917, by an amount of \$2,500,000, during which period the fares averaged 4.11 cents per revenue passenger.

The increased cost of wages and material, as well as the increased fixed charges due to additional capital required, brought the estimated cost per revenue passenger to approximately 5.5 cents. This increase of about \$2,500,000 was made up as follows:

(a) Estimated increase in wages for thirteen months.....	\$750,000
(b) Deficit incurred since the putting in force of the contract until June 30, 1918.....	400,000
(c) Estimated increased cost of material and supplies.....	1,000,000
(d) Additional fixed charges.....	280,000

The cash fares from Montreal to outside points and return are less than before, but there seems to be no provision for the commutation tickets which made travel for citizens of the outlying suburbs quite cheap to date. On the Lachine line the present cash fares are from 5 to 15 cents in addition to the Montreal local fare. Now the cash fare is from 5 to 10 cents. To the Back River territory the fares have been 5 to 15 cents in addition to the city fare, but now Cartierville and Ahuntsic have only the city fare to pay, and it will be more favorably affected than almost any other part of the island. To Cartierville the additional cash fares now are from 5 to 15 cents. To Notre Dame de Grace a cash fare of 5 cents is now paid, so that no difference takes place there except when the traveler desires to transfer. To Bout de l'Île the present prices are 5 to 15 cents additional. The 5-cent cash fare to Rosemount disappears, and the residents there are in the same situation as Notre Dame de Grace and the rest of the city. A 5-cent fare is also charged from Queen's Park in Verdun to the end of the line. From last January there has been a 5-cent cash fare from St. Laurent into the city, but this now comes under the uniform tariff. The Pointe aux Trembles rate has been 5 cents in addition to the city fare to now.

A One-Man Car City

On June 30 the Boone Avenue and Lidgewood line of the Washington Water Power Company, Spokane, Wash., was equipped with one-man cars. This is the last line, with the exception of the Hillyard line, which is classed as semi-interurban, to be placed under the one-man system. All lines of the company except the Hillyard henceforth will be covered by the single-end service. The Washington Water Power Company, with the com-

pletion of the last forty converted cars started last winter, now has eighty-five single-end cars fully equipped and in service.

Right to Referendum Upheld

In Buffalo Six-Cent Fare Case Appellate Division of Supreme Court Rules in Favor of Voters

The Appellate Division of the Supreme Court at Rochester, N. Y., on July 2, affirmed the decision of Justice Herbert P. Bissell in the Supreme Court of Erie County, Buffalo, N. Y., in which the court held that the voters of Buffalo, N. Y., can hold a referendum to determine whether or not the action of the City Council shall be repealed in reference to suspending the franchise of the International Railway fixing a 5-cent fare and recommending to the Public Service Commission of the Second District that a 6-cent fare be fixed within the city limits.

Presiding Judge Kruse and Judges De Angeles, Hubbs and Lambert held that the Milburn agreement between the city and the railway cannot be amended to permit a 6-cent fare without disposing of "property and rights" of the city, and therefore is a subject referable to the people, who, under the city charter, have the right to hold a referendum on franchise agreements.

Consent of the Appellate Division for an appeal to the Court of Appeals at Albany, N. Y., was obtained by Henry W. Killeen, of Penney, Killeen & Nye, of counsel for the International Railway, and the appeal will be argued in Albany within the next week. The railway maintains that the action of the City Council is merely an emergency measure for the period of the war and was taken so that the traction company's employees could be granted an increase in wages and so that improvements and extensions could be made to the company's city properties, and is therefore not subject to a referendum.

Announcement was made on July 3 by Mr. Killeen on behalf of the railway that when the board of directors of the company holds its next meeting, it will vote to suspend the operation of increased wages to its employees until such time as the company can receive the benefit of an increased rate of fare. In a formal statement, Mr. Killeen declared that the wage increase for platform men amounting to 8 cents an hour calls for a payroll increase of \$2,000 a day, which the company cannot afford to pay if the 5-cent fare is continued.

"As soon as the directors of the International suspend the payment of the wage increase recently granted its employees and there is danger of a strike, I will make application to the court for the appointment of a receiver for the International Railway," said George L. Buck, Mayor of Buffalo, in a letter to E. G. Connette, president of the International Railway.

Fearing a strike of the company's employees because the proposed referendum will probably overwhelmingly

oppose a 6-cent fare, Clifton Reeves, government labor mediator, has been sent to Buffalo to investigate the situation and make recommendations to the federal war industries board. Unable to affect an agreement between the City Council and the International Railway, Mr. Reeves on July 9 sent a telegram to the War Industries Board asking if it has the authority or can take over the operation of the railway.

The Appellate Division at Rochester, N. Y., was greatly interested in the points of law advanced by the company because it was the first time in the court's history that a referendum argument has been heard in a franchise case in a city where the commission charter applies. The court wanted to know whether it really was an "intelligent" vote that was cast in such matters. Mr. Killeen on behalf of the International Railway said that the action of the City Council would be repealed by the voters. At this point, Judge De Angeles asked:

"By ridicule or by some other line of publicity or campaign, could not the voters be persuaded to vote other than in an intelligent way and if that occurred, would not a second vote be necessary when the facts were straightened out, to obtain an intelligent vote?"

Court Action in Fare Case

Judge Howard Wiest, in the Ingham County Circuit Court, Lansing, Mich., on July 8 issued a temporary injunction, effective immediately, restraining the Michigan Railway, Kalamazoo, Mich., from charging in excess of 2 cents a mile as a passenger rate on its lines. Steps were immediately taken by the railway officials to apply for a judicial ruling dissolving the enjoining order.

The road had been charging 3 cents a mile under the recent government order raising all railroad fares to that figure. The Michigan Company has nearly 300 miles of trackage and it is built to be operated in the same manner as the steam roads with which it has traffic arrangements in the exchange and transfer of passengers and freight at intersecting points, the only difference being that the Michigan road is electrically equipped. It competes with the steam roads for business along its entire lines. When the railroads were taken over by the government, the Michigan Railway was included. On the return to its original owners of what are known as the "short roads," this company was on the list.

The road in opposing the issuing of the injunction held it was under government control and therefore exempt from provisions of the State law. Attorney-General Groesbeck, appearing for the State, contended this was not the fact, as the Director-General of Railroads McAdoo had severed that connection by turning back the road to its owners and therefore the statute limiting the rate to 2 cents a mile applied. This point, it is believed, doubtless influenced the court's action.

Seven-Cent Fare Denied

New Jersey Commission, However, Will Permit One-Cent Transfer Charge In Decision Rendered July 12

The State Board of Public Utility Commissioners of New Jersey on July 12 denied the application of the Public Service Railway, Newark, for an increase in fare from 5 cents to 7 cents and to charge 2 cents on an original transfer and another cent for a transfer upon a transfer. The board, however, issued an order allowing the company upon certain conditions to charge 1 cent for each original transfer on each fare. The board ruled that in order to make this charge, the company must before July 24 file its acceptance in writing of the following conditions:

1. The company must file with the board monthly, beginning with June last a statement giving the total amount of wages and salaries paid, classified by character of service rendered to the company, and the rates per hour, day or period and indicating any change in classification of employees and the resulting wage rate.

2. The company must also file with the board for each month, beginning with June last, a complete comparative income statement for 1917 and 1918 together with mileage, traffic and miscellaneous statistics.

3. The company must file with the board before Jan. 1, 1919, a plan whereby the present method of charging may be revised by an equitable zoning system over its entire territory, proper consideration being given to all of the elements to more properly relate the cost of service with the length of haul and value of service.

The order of the commission will become effective on Aug. 1.

Transportation News Notes

Hearing on One-Man Cars for Savannah.—The Savannah (Ga.) Electric Company has petitioned the Railroad Commission of Georgia for permission to use one-man cars and to introduce the skip stop. The commission set July 10 for a hearing.

West Penn Plans Skip Stop.—The West Penn Railways, Pittsburgh, Pa., and the affiliated Wheeling (W. Va.) Traction Company are at present making an intensive study of the skip-stop plan of operation. The work is being done at the request of the Fuel Administration in its campaign for fuel saving.

Columbus Fare Request Renewed.—At the last meeting of the City Council of Columbus, Ohio, a second request from the Columbus Railway, Power &

Light Company for a straight 5-cent fare for a period of six months was filed without comment. So far the Council has ignored the fare question, despite appeals made to it by business men, business bodies and civic societies.

Women for Small Washington Road.—The North Coast Power Company, Vancouver, Wash., plans to put women operators on its cars, just as soon as they become sufficiently acquainted with operating details. Women have taken over the work of cleaning cars at the carhouses. During the daytime, cars will be run by one operator, but after dusk it is planned to put on two.

Oregon Interurbans After Increased Rates.—Tariffs asking for 25 per cent increase in freight rates have been filed with the Public Service Commission of Oregon by all save six of the steam and electric railways operating in the State. The Public Service Commission retains jurisdiction over the electric lines, it is said, and it will no doubt suspend their tariffs pending hearings.

One-Man Safety Cars Sanctioned.—One-man cars have been allowed the Fort Wayne & Northern Indiana Traction Company by the Public Service Commission of Indiana for use in Logansport, Lafayette and on certain streets in Fort Wayne, provided the cars are equipped with approved air brakes and standard hand brakes and that all steam railroad crossings are guarded by gates or flagmen.

Increase Denied to Suburban Cars in City.—The New York Public Service Commission has denied the Buffalo, Lockport & Rochester Railroad permission to charge a 6-cent fare on that part of its line entirely within the city of Rochester. This decision is based on the recent rule of the Court of Appeals in the so-called Rochester case, denying the commission the right to grant an increase in fares when it is contrary to the provisions made part of the franchise contract accepted by a railroad.

Fare at Springfield May Be Raised.—The City Commissioners of Springfield, Ohio, have expressed their willingness to increase the rate of fare received by the Springfield Railway from six tickets for a quarter to straight 5 cents. C. E. Ashburner, city manager, has suggested that a change be made in the franchise ordinance to this effect. The increase, which will amount to about \$27,000 a year, will cover the recent advance in the wages of the motormen and conductors.

Withdrawal of Special Tickets Sanctioned.—An order permitting the East St. Louis & Suburban Railway, East St. Louis, Ill., to increase its charge for chartered cars run between Belleville and French Village from \$12.50 to \$15 a car per round trip, was entered by the Public Utilities Commission of Illinois on July 5. The company is also permitted to withdraw from sale all party tickets and to increase its commutation book prices from \$6 to \$7. The order is effective five days from the date of its signature.

Skip Stop Before Minneapolis Council.

—The skip-stop plan of operating for the Twin City Rapid Transit Company will be acted upon by the City Council of Minneapolis, Minn., on July 12. Recommendation that the plan be put into effect in Minneapolis simultaneously with St. Paul, about July 15, was made by the Council committee on street railway matters and extensions at a meeting on July 1. The committee report was favored by all members except one. Trial of the plan for ninety days is recommended by the committee report.

Would Fix Seattle Municipal Fares.

—An ordinance has been introduced in the City Council of Seattle, Wash., by Councilman Oliver T. Erickson, governing fares on Seattle's municipal railway lines. The new ordinance will make cash fares 5 cents, with transfer privilege. Tickets will be sold on the cars at six for 25 cents, but will carry no transfer privileges. School children, on presenting a certificate signed by their teacher, will pay 3-cent fares, or two may ride for 5 cents. Tickets will be 2½ cents or ten for 25 cents from the conductor. Employees of the municipal railway may ride free on displaying their badges.

Emergency Increase Denied.—The Denver (Col.) Tramway was denied a 3-cent emergency increase in the fare between Denver and Golden when an application affecting the line routed by way of Berkeley was filed on June 28 with the Public Utilities Commission of Colorado. The commission contended that no order could be granted on such short notice, the application providing that the rates become effective within five days after tariffs were presented. The commission has signified its willingness to accept for filing a new tariff which will provide the customary thirty days' notice of intention to increase rates.

Long Island Roads Want Increases.

Applications for increase of fare have been received by the Bureau of Franchises and the Board of Estimate of New York City from the New York & Long Island Traction Company, Hempstead, and the Long Island Electric Railway, Long Island City. The Long Island Electric Railway claims it should have charged 6.88 cents per passenger last year to have cleared its operating expenses and fixed charges, while the New York & Long Island Traction Company alleges it should have charged 6.11 cents per passenger to have made its operating expenses and fixed charges.

Petaluma Line Wants Increase.

The Petaluma & Santa Rosa Railway, Petaluma, Cal., which operates a boat line between San Francisco and Petaluma, and electric lines between Petaluma, Santa Rosa, Sebastopol and Forestville, has asked the Railroad Commission for permission to increase its passenger and freight rates. The company wants all its passenger fares raised 5 cents. If granted by the com-

mission, this will make every fare between all points on its lines 5 cents higher. The proposed new freight rates are a 25 per cent increase over the present schedules, so that the company will have the same rates as the railroads under the order of Director General of Railroads McAdoo.

Inquiry Into Hudson River Fares.

The United States Senate has adopted a resolution authorizing the committee on interstate commerce to ascertain why the Railroad Administration took over the electric lines between New York, Jersey City, and Newark, N. J., operated by the Hudson & Manhattan Railroad. The committee will ask whether any necessity existed for taking over these lines, which, according to Senator Frelinghuysen, author of the resolution providing for the inquiry, are not used in any way for military purposes, either for carrying troops or transporting supplies. The question in which Senator Frelinghuysen is most deeply interested, however, is that of the increased fare.

Morris County Wants Higher Rates.

—Notice has been served by the Morris County Traction Company, Morristown, N. J., upon the governing bodies of the twenty municipalities in which the company operates that it intends shortly to appeal to the Board of Public Utility Commissioners for an increase in its rates of fare. A flat 6 cents in each of its twelve zones is to be the object of the petition, as against a 5-cent fare generally and tickets at six for a quarter, which are sold solely within the limits of Summit. Further, the company, which made a 2½-cent fare for school children going to and from school at regular hours one of the conditions of its franchises in many places, wants this fare set at 3 cents everywhere.

Reading Suburban Fares Eight Cents.

—Abnormal operating conditions have made it necessary for the Reading Transit & Light Company, Reading, Pa., to increase the fares on its suburban lines of Reading, Lebanon and Norristown to 8 cents. Under the revised schedules filed with the Public Service Commission of Pennsylvania to become effective on Aug. 1, the city of Reading and territory for some distance into the suburbs in all directions is preserved as a 6-cent zone. City and suburban passengers may continue to ride to and fro between Reading and West Reading, Wyomissing and West Lawn; Mount Penn, Carsonia and Stony Creek; Black Bear and Paxon's Crossing; Oakbrook and Shillington; Ilyde Park and Rosedale, for a 6-cent fare.

Increase in Milwaukee Suburban Fares.

—A fare of 3 cents a mile for interurban service and 2 cents a zone for suburban service went into effect on the lines of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., on July 3, following an order granted by the Railroad Commission of Wisconsin. The former rate on interurban service was approximately 2½ cents a mile, and

the suburban fare was on the basis of thirty tickets for 50 cents; the new fare is thirty tickets for 60 cents, or at the rate of 2 cents per zone. The decision on the suburban fare is temporary, that on the interurban permanent. Mileage books will continue to be acceptable for six months, while zone tickets were accepted until July 11. The zone tickets are now being redeemed at face value.

Spokane Rate Advances Postponed.

Some misunderstanding relative to the proposed flat increase of passenger rates to 3 cents a mile on the suburban lines of the Washington Water Power Company, Spokane, Wash., and the minimum charge of 10 cents for adults, which were to have become effective early in June, resulted in the schedules having to be changed to become effective on July 30. The freight rates were to have been raised 25 per cent on June 25 and these were also put over to July 30. Protests have been filed with the State Public Service Commission against the Spokane & Inland Empire Railroad, which raised rates at the time the rates on steam roads were ordered advanced by the Director General.

Atlantic City Advance Inadequate.

Clarence L. Cole, receiver of the Atlantic City & Shore Railway, Atlantic City, N. J., has served notice upon the Board of Public Utility Commissioners of New Jersey of an intention to increase fares in the Inlet loop, Atlantic City, to Savannah Avenue, Margate zone, from 5 to 6 cents on and after Aug. 6. A similar advance is intended for the Savannah Avenue-Longport zone at the same time. The price of 100-trip family books, Atlantic City to Longport, will be increased from \$5.25 to \$7. In May the company was permitted by the commission to put into effect fare increases which it was estimated would result in increasing the revenue of the company \$20,058. This was referred to in the *ELECTRIC RAILWAY JOURNAL* of May 25, page 1029.

Favorable Report on Skip Stops.

In line with the wishes of the United States Fuel Administration the committee on local transportation of the City Council of Chicago, Ill., has reported favorably to the City Council an ordinance providing for skip-stop operation of the electric railways in the city of Chicago. The plan, which was recommended to the committee by the city's department of public service, provides that cars shall not be required to make more than eight stops per mile for the purpose of letting off or taking on passengers. A survey, made by Thomas E. Flanagan, acting transportation supervisor, shows that at present there are close to 11,400 stopping places on the surface lines in Chicago and that under the proposed plan of skip-stop operation this number will be 7500, a reduction of 34 per cent. It is reported that skip-stop operation is to be put into effect on all surface lines throughout the city on the date that the proposed ordinance becomes effective.

Legal Notes

FEDERAL COURTS.—*A Franchise Is a Contract.*

Where a resolution of a board of county commissioners granted to a person therein named and his successors the right to construct, maintain and operate an electric railroad along a specified state road, without specifying any limit of time, the grant was not a mere revocable right, but a "contract" not subject to annulment by a resolution of the board of county commissioners declaring it terminated; in view of Const. Art. 1, Sec. 10, prohibiting the impairment of the obligation of contracts. (*Northern Ohio Traction & Light Company, et al. vs. State of Ohio ex rel.*, 38 Supreme Court Reporter, 196.)

FEDERAL COURTS.—*Limited Franchise Extended to Perpetuity.*

An ordinance granting "all the right and authority that" the city had "the capacity to grant, to construct, hold and operate a street railroad upon and along" named streets, which provided for termination of the rights conveyed only in event of the failure of the grantees to keep their covenants, must be deemed a perpetual franchise, although a prior ordinance "prescribing the terms and conditions of street passenger railroads within" the city provided that "all contracts made under the provisions of this ordinance shall be for the term and period of twenty-five years," since this prior ordinance did not address itself to the construction or scope of future ordinances.

Where plaintiff street railway company, operating under a perpetual franchise, was authorized by an ordinance "granting the right-of-way over certain streets" to contract with another street railway company, operating under a twenty-five-year franchise having then eight years to run, for the right-of-way held by the latter and to occupy and use the streets specified in the contract of that road with the city "subject to the conditions limitations and restrictions contained in the ordinances regulating" plaintiff's right to streets occupied by it, and, in accordance with the ordinance, plaintiff purchased the other company's lines, it thereby acquired a perpetual franchise therefor, for the language of the ordinance conveyed more than a license to purchase what the vendor had, the title and the operative words importing a grant. (*City of Covington vs. South Covington & Cincinnati Street Railway*, 38 Supreme Court Rep., 376.) (See also note on page 822 of the issue of the ELECTRIC RAILWAY JOURNAL for April 27, 1918.)

CALIFORNIA.—*Liability for Injury Resulting from Collision with Unattended Automobile.*

Where an owner negligently left his automobile unattended on street car tracks and a street car was negligently run into it, catapulting it against one working at the curb of the street, the owner of the automobile was liable for the injuries. (*Keiper vs. Pacific Gas & Electric Co.*, 172 Pacific Rep., 180.)

LOUISIANA.—*Cars Need Not Stop Exactly at Station.*

Where a street car stopped 15 or 20 ft. beyond its usual stopping place at a place where the step of the car was 15½ in. or 16 in. above the roadway, so that a passenger might safely alight by extending his foot 7 in. out and stepping down while holding onto the handle-bar, such place was reasonably safe, and the carrier was not liable for injury to passenger while alighting. (*Clogher vs. New Orleans Railway & Light Co.*, 78 Southern Rep., 248.)

MISSOURI.—*Consideration for Release—Subsequent Damage.*

A release signed by an injured employee of an electric railway company in consideration of medical services or as a condition of being re-employed is based on a sufficient consideration. Such a release, covering all "actions, causes of actions, suits, controversies, claims and demands whatsoever," bars an action for consequences subsequently arising from the injury of which the employee was not aware at the time he signed it. (*Hogard vs. Kansas City Railways*, 202 Southwestern Rep., 431.)

NEW JERSEY.—*Validity of Ordinance Forbidding the Transportation of Liquor.*

The commission government acts do not justify an ordinance making it unlawful for any common carrier to deliver in the city any alcoholic liquor consigned to a club, lodge or other association. (*West Jersey & Seashore Railroad vs. City of Millville*, 103 Atlantic Rep., 246.)

NEW YORK.—*Dancing Floor at Park Is a Place of Public Accommodation, Resort or Amusement.*

The dancing floor of an amusement park maintained by an electric railway as an auxiliary to and to increase its passenger business is a "place of public accommodation, resort or amusement" within civil rights law, Sec. 40. Hence the exclusion of a colored man from the floor on account of his color was a violation of the law. (*Johnson vs. Auburn & Syracuse Electric Railroad*, 119 Northeastern Rep., 72.)

NEW YORK.—*Regulations to Require Orderly Boarding.*

Where a street car was halted preparatory to taking on passengers, and railway company's inspector ordered the men to stand back so that the women could board first, it was within the power of such inspector to exercise the force necessary to compel compliance with the order. (*Garriott vs. New York State Railways*, 119 Northeastern Reporter, 94.)

OHIO.—*"Repave" and "Repair" Defined.*

The word "repave" in reference to a street improvement relates generally to a new pavement. The word "repair" is inherently local and more or less temporary. It is none the less "repair" because new material must be used in order to effect such "repair." (*Cleveland Railway vs. City of Cleveland*, 119 Northeastern Rep., 202.)

PENNSYLVANIA.—*How a Change of Street Railway Rates Must Be Posted.*

Under the public service commission act the posting and publishing of a schedule changing the rates of a street railway company are conditions precedent to the taking effect of the changed rate, and where the schedule of change is not properly posted, the Public Service Commission may restrain the company from putting the changed rate into effect.

The word "post" as used in this connection means the bringing to the notice or attention of the public by affixing to a post or wall, or putting up in some public place; to placard. It is insufficient if copies of the new schedule are sent to the company's agents at its offices and stations, with directions to keep a copy on file with the copy of schedule of fares for street car service on file at such offices, but no copy of the schedule was posted in the rooms to which the public had access. (*City of Pittsburgh vs. Pittsburgh Railways*, 103 Atlantic Rep., 372.)

TEXAS.—*Power to License Jitneys and Interest of Street Railway in the Subject.*

A street railway having a valid franchise to use city streets has such an interest in the use of the city streets that it may sue to restrain the use thereof by jitneys licensed under an alleged invalid ordinance. The Dallas City charter empowers the board of commissioners to regulate charges of franchise holders and to prescribe the service upon fair hearing, so that an ordinance regulating jitneys and authorizing them to be licensed, passed under the initiative and referendum clauses, is invalid. (*Lindsley et al. vs. Dallas Consolidated Street Railway*, 200 Southwestern Rep., 207.)

WEST VIRGINIA.—*Conductor Must Discharge Duty to Alighting Passengers Before Going Forward to Signal at Crossing.*

The fact that the rules of the railway company require conductors before crossing the tracks of a steam railroad to go forward and onto the tracks of the other railroad and look out for approaching cars or locomotives thereon before signaling the motorman to go ahead will not excuse conductors from first discharging their duty to passengers alighting or getting on the car, and his negligent performance of any of the duties so imposed upon him will render the railway company liable to a passenger injured thereby. (*Cain vs. Kanawha Traction & Electric Co.*, 95 Southeastern Rep., 88.)

Personal Mention

J. H. McGraw Honored

Proprietor of Electric Railway Journal
Completes Thirty-Three Years
of Publishing Career

On June 15, 1918, James H. McGraw, president of the McGraw-Hill Company, Inc., completed thirty-three years of service as a publisher. To commemorate this event a committee of the employees arranged for the presentation to Mr. McGraw of a bronze tablet at exercises which were held on June 28 at the offices of the company. The tablet read as follows:

"To James H. McGraw, to commemorate his thirty-three years of service as a publisher; to bear witness to his vision, his ideals and their influence on technical journalism and engineering thought; to testify to their pride in his accomplishment, their faith in his leadership, their admiration, respect and love, this tablet is erected by the men and women of the McGraw-Hill Company, Inc., June 15, 1918."

The meeting was attended by some 800 employees and after the address of presentation, Mr. McGraw, to whom the proceedings were a surprise, made a short speech of appreciation. The tablet will be erected in the building owned by the company at Tenth Avenue and Thirty-sixth Street, New York.

Woman Welfare Worker

Brooklyn Rapid Transit Company Appoints Miss Bullock to Look After
Interests of Conductorettes

Miss Grace Bullock will be placed in charge of welfare work among the women employees of the Brooklyn (N. Y.) Rapid Transit Company, in association with George W. Edwards, welfare administrator of the company. Miss Bullock is a sister of the late Capt. Harry A. Bullock, secretary of the New York Municipal Railway Corporation and head of many committees of the Brooklyn Rapid Transit organization, who was killed recently while serving with the American forces in France.

Short Line Section Manager

Railroad Administration Will Have
Such Official to Protect Short Lines
Relinquished by Government

An announcement from the Director-General of Railroads on June 29 explains the policy of the administration toward those short-line railroads over which federal control is not considered needful or desirable. It is to keep their status in every reasonable respect as favorable as that which they enjoyed during the three years ended June 30, 1917, and to give them fair divisions of joint rates, and a reasonable car

supply, circumstances considered, and to protect them against any undue disturbance of the routing of traffic. To carry out this policy, the Railroad Administration will establish a "Short Line Railroad Section," whose manager will be charged with ascertaining what is necessary to give such reasonable protection to these railroads. This announcement carries the specific indorsement of President Wilson.

Mr. Winsor Elected

Head of Adjustment Department Tacoma Company Made President of
Pacific Claim Agents

H. G. Winsor, superintendent of investigation and adjustment of the Tacoma Railway & Power Company and the Puget Sound Electric Railway, Tacoma, Wash., was elected president of



H. G. WINSOR

the Pacific Claim Agents' Association at the recent meeting of the association in Portland, Ore. He was formerly first vice-president of the association. Mr. Winsor was born in Bridgewater, Mass., in 1868. He was educated in the public schools and afterward took a special course in electrical engineering. Mr. Winsor entered public utility work with the Minneapolis General Electric Company as chief inspector, in which capacity he served from 1907 to 1913. In April, 1913, he resigned from the power company at Minneapolis to accept the position which he now holds with the Stone & Webster companies at Tacoma. Mr. Winsor has been greatly interested in the work of the American Electric Railway Claims Association, and at the convention of that association in October, 1916, he presented a paper "Motor Vehicle Accidents and Traffic Regulation," which attracted considerable attention. In this paper Mr. Winsor presented a table compar-

ing reports from twenty-five cities to show that while the increase in traffic has been phenomenal the electric railways had succeeded in keeping the percentage of increase in collisions between cars and motor vehicles within reasonable bounds.

W. R. Childress, assistant superintendent of the railway department of the Southern Public Utilities Company, Charlotte, N. C., has taken over the foremanship of the carhouse of the company relinquished by C. J. Addicks.

Harry H. Lloyd, secretary to the president of the Terre Haute, Indianapolis & Eastern Traction Company and the Indianapolis Traction & Terminal Company, Indianapolis, Ind., has been appointed purchasing agent for these properties, succeeding R. R. Smith.

W. N. Smith, formerly electric railway engineer of Westinghouse Church Kerr & Company, who has been engaged recently on engineering matters on the Pacific Coast, has been appointed consulting electrical engineer of the Winnipeg (Man.) Electric Railway and has moved to Winnipeg.

I. M. Cook, for the last seven years foreman of the Southern Public Utilities Company's carhouse, in Dilworth, N. C., has resigned. Mr. Cook has been with the company for thirteen years. He will become foreman of shops for the Columbia Electric Street Railway, Light & Power Company, Columbia, S. C.

C. J. Addicks, for several years foreman in charge of the carhouse of the Southern Public Utilities Company, Charlotte, N. C., on Broad Street, has resigned, to accept service with the Macon Railway & Light Company, Macon, Ga. For the last five years he has been in charge of the repair work of the company.

C. O'B. Murphy, assistant general manager of the American Public Utilities Company, Grand Rapids, Mich., has been transferred as vice-president and general manager to the Merchants' Public Utilities Company and the Merchants' Heat & Light Company, Indianapolis, which are controlled by the American Public Utilities Company.

Frank G. Jones has been appointed fuel director for the District of Columbia by the United States Fuel Administration. Mr. Jones, who is a New Yorker by birth, was for twenty years partner of C. K. G. Billings in the ownership of the street railway at Memphis, Tenn., and was interested in the street railway business in other cities.

James M. Brown, chief clerk under Col. A. R. Piper of the South Brooklyn Railway, included in the Brooklyn (N. Y.) Rapid Transit System, has been commissioned captain in the quartermaster's corps and has been assigned to a regiment which is being recruited and trained for service in France. Captain Brown has been connected with the Brooklyn Rapid Transit organization for thirteen years.

Joseph F. Roach has been appointed assistant superintendent of interurban lines of the Portland Railway, Light & Power Company, Portland, Ore. Mr. Roach entered the employ of the company in the train service in 1902 and since that time has filled various positions, including inspector, chief dispatcher and train rule examiner.

R. R. Smith, purchasing agent of the Terre Haute, Indianapolis & Eastern Traction Company and the Indianapolis Traction & Terminal Company, Indianapolis, Ind., has been appointed general manager of the Chicago, South Bend & Northern Indiana Railway, succeeded in T. F. Grover, who resigned recently. Mr. Smith will assume his new duties on July 15.

H. E. Funk, engineer of rapid transit lines of the Brooklyn (N. Y.) Rapid Transit Company, has been commissioned as a captain in the Engineers' Reserve Corps and has reported at Camp Lee for service. Mr. Funk entered the employ of the Brooklyn Rapid Transit Company in 1905 as track foreman. He was formerly superintendent of buildings of the company.

Edward J. Peartree, who has been general superintendent of the Trenton & Mercer County Traction Corporation, Trenton, N. J., for the past three years, has been appointed acting general manager of the company to succeed the late Peter E. Hurley. Mr. Peartree went to Trenton from Troy, N. Y., in 1915, taking a position as superintendent of traffic on the Trenton line.

Martin Ackerman, Cincinnati, Ohio, has been appointed manager of the Cincinnati & Dayton Traction Company, which has been placed in the hands of the Warren Bicknell Company, Cleveland, Ohio, as announced previously in the *ELECTRIC RAILWAY JOURNAL*. Mr. Ackerman has been manager of the Interurban Railway & Terminal Company, Cincinnati. It is said he will make his headquarters at Hamilton.

George Garret, for sixteen years master mechanic and superintendent of rolling stock on the staff of the Winnipeg (Man.) Electric Railway, has resigned his position and will take a well-earned rest before entering similar duties elsewhere. As noted in the *ELECTRIC RAILWAY JOURNAL* for July 6, Mr. Garret has been succeeded by W. H. McAloney, former superintendent of rolling stock for the Denver (Col.) Tramways.

M. M. Lloyd, master mechanic of the Des Moines (Iowa) City Railway and the Inter Urban Railway, Des Moines, Iowa, has resigned to accept a position as superintendent of equipment with the Saginaw-Bay City Railway at Saginaw, Mich. Mr. Lloyd has been with the Des Moines properties since 1912. Previous to that he was master mechanic of the East St. Louis & Suburban Railway for seven years and with the United Railways, St. Louis, Mo., for twelve years.

A. L. Kenyon has resigned as general manager of the Columbia Railway, Gas

& Electric Company, Columbia, S. C., and is now engaged in war work for the government, manufacturing ammonium nitrate with the Air Nitrates Corporation at Toledo, Ohio. Mr. Kenyon supervised the making of many improvements for the Columbia utility during his administration. He also took an active part in the affairs of the city and did much to promote civic betterment. He was a prominent member of the Columbia Rotary Club.

A. C. Moore has resigned as auditor of the Chicago, North Shore & Milwaukee Railroad, Chicago, Ill., to accept a similar position with the Chicago, South Bend & Northern Indiana Railway and the Southern Michigan Railway, South Bend, Ind. Mr. Moore's initials were incorrectly given as J. C. Moore in the item which appeared in the *ELECTRIC RAILWAY JOURNAL* of June 22. Previous to his position with the Chicago, North Shore & Milwaukee Railroad, Mr. Moore had been auditor of the Oklahoma Railway, Oklahoma City, and assistant auditor of the Union Traction Company of Indiana.

T. F. Grover has resigned as vice-president and general manager of the Chicago, South Bend & Northern Indiana Railway and the South Michigan Railway Company, South Bend, Ind. Mr. Grover was formerly general manager of the Terre Haute, Indianapolis & Eastern Traction Company in charge of both the electric lighting and railway business for more than ten years. He has been continuously connected with the public utility business for the last twenty-eight years. During that time he has served as president of the Fond du Lac Street Railway & Light Company, the Fond du Lac Gas Company, and the Fond du Lac & Oshkosh Railway and was vice-president and general manager of the Eastern Wisconsin Railway & Light Company. Mr. Grover expects to enjoy a well-earned vacation for a few months. His plans for the succeeding period have not been definitely determined.

M. Bernard, assistant engineer of special work, way and structures department, Brooklyn (N. Y.) Rapid Transit System, has resigned to enter the engineering department of Ford, Bacon & Davis, New York. Mr. Bernard was graduated from St. Johns College, Brooklyn, in 1904, and engaged the two following years in general construction work, then spent one year with William Wharton, Jr., & Company, Inc. In 1907 he entered the way and structures department of the Brooklyn Rapid Transit Company as a general engineering draftsman. From 1910 to 1913 he served as general assistant to the engineer of elevated lines and the assistant engineer of the surface lines. He was appointed to his present position in 1913. Mr. Bernard has been a frequent contributor on track subjects to the columns of this paper. His series of drawings and tabulations of costs of standard special work layouts, published during the latter part of 1917, attracted especial attention.

Obituary

Alvah Kittredge Todd, secretary of many companies under the management of Stone & Webster, Boston, Mass., died recently. Mr. Todd was graduated from Harvard University in the class of 1901. Shortly afterward he entered the corporation department of Stone & Webster. He was thirty-nine years old.

John Cline, locomotive foreman at the Marine City roundhouse of the Rapid Railway System, controlled by the Detroit (Mich.) United Railway, died on July 2, Mr. Cline entered the employ of the Detroit United in the horse car days prior to 1892 as a blacksmith and had been constantly in the employ of the company until his death.

George A. Steel, who with his brother financed and built several of the early railway lines in Portland, Ore., now included in the system of the Portland Railway, Light & Power Company, is dead. Mr. Steel was born in Stafford, Ohio, on April 22, 1846. He had lived in Portland since 1862. He was a former postmaster of that city and served as treasurer of the State of Oregon.

E. J. Haines, first lieutenant, United States Signal Corps, died of pneumonia recently at Camp Devens, Mass. Mr. Haines was formerly assistant to the superintendent of equipment of the Bay State Street Railway, Boston. He was well known in the New England electric railway field as a young man of unusual talent and before joining the colors he had begun to make a reputation for himself as an expert engineering witness in street railway accident cases. Mr. Haines was also talented musically and had written a number of successful motion-picture scenarios and short stories. He was about twenty-eight years of age. He was held in high esteem on the Bay State Street Railway and by a wide circle of friends and acquaintances outside the railway company.

Jacob L. Greatsinger, president of the Corning & Painted Post Street Railway and the Elmira, Corning & Waverly Railway, Elmira, N. Y., and formerly president of the Brooklyn (N. Y.) Rapid Transit Company, died on July 3 in his home in Elmira, N. Y., at the age of sixty-eight years. Mr. Greatsinger succeeded Clinton L. Rosser as head of the Brooklyn Rapid Transit Company in March, 1901, and was in turn succeeded two years later by Col. E. W. Winter. Mr. Greatsinger was educated at the Elmira Free Academy, and began his railroad life on the Erie Railroad, firing switch engines. Later he served in almost every capacity up to general manager of various railroad properties. At the time of his appointment to Brooklyn Mr. Greatsinger was president of the Duluth & Iron Range Railroad.

Construction News

Construction News Notes are classified under each heading alphabetically by States. An asterisk (*) indicates a project not previously reported.

Recent Incorporation

Independence & Sugar Creek Railway, Independence, Mo.—A charter has been secured by the Independence & Sugar Creek Railway to construct a line from Independence to Sugar Creek. The company has a nominal capital of \$2,000. The line will be built and operated by the Kansas City (Mo.) Railways, but will be financed temporarily by property owners along the route. Officers of the Kansas City Railways are officers of the new company. [June 29, '18.]

Franchises

Santa Rosa, Cal.—The Petaluma & Santa Rosa Electric Railway has asked the Board of Supervisors for a new fifty-year franchise for Sonoma County. The old franchise has twenty years to run. Similar applications for franchises have been presented in the cities and towns through which the railroad passes. The Board of Supervisors directed notice of sale of the franchise next month.

East St. Louis, Ill.—The East St. Louis, Columbia & Waterloo Railway has asked the City Council of East St. Louis for a twenty-year franchise. The present ten-year franchise expires on Jan. 1, 1919. The company uses the tracks of the East St. Louis & Suburban Railway.

Springfield, Ill.—The Central Illinois Public Service Company has filed an application with the Public Utilities Commission of Illinois for a certificate of convenience and necessity to construct and operate a 16,000-volt electric transmission line from Milford, Iroquois County, through Iroquois, Kankakee and Vermilion Counties to Hoopes-ton.

Camden, N. J.—The Board of Commissioners of Camden has passed an ordinance authorizing the Public Service Railway to install new poles and equipment for its line on Adeline Street, from Liberty Street to Cass Street.

Fert William, Ont.—The Mount McKay & Kakabeka Falls Railway has applied to the City Commission of Fort William for permission to operate over the city lines of the Fort William Electric Railway to the vicinity of the market.

Track and Roadway

Decatur, Ala.—A communication from H. L. Merrill, president of the Decatur Booster's Club, states that nothing definite has been done regarding the construction of an electric railway from Decatur to Florence, Sheffield and Tusculumbia, as it would be almost impossible to construct the line owing to the high cost of material and war conditions generally.

Calgary (Alta.) Municipal Railway.—Plans are being considered by the City Council of Calgary for straightening and shortening the Ogden line of the Calgary Municipal Railway.

Municipal Railways of San Francisco, San Francisco, Cal.—The Board of Supervisors recently adopted the plan of City Engineer O'Shaughnessy to operate the municipal cars over the tracks of the United Railroads through the district west of Twin Peaks Tunnel. The arrangement provides joint privileges by the payment to the United Railroads of \$100,000, without surrendering any rights. Under the new plan city cars will run over the Ocean Avenue tracks from the junction of Sloat Boulevard and Corbett Road to Harold Avenue. The city agrees also to reconstruct the Taraval Avenue line from Twentieth Avenue to Thirty-third Avenue. City Engineer O'Shaughnessy explained that by joint operation with the United Railroads the city would save at least \$150,000 over the plan of building its own tracks.

San Francisco-Oakland Terminal Railways, Oakland, Cal.—Work has been begun by the San Francisco-Oakland Terminal Railways on the construction of a spur track to the site of the Union Construction Company's new shipbuilding plant. The spur will be 900 ft. long and will connect with track on the property of the company. A sidetrack about 1000 ft. long will be constructed alongside of the track on the line running out to the mole. Construction work has also been begun on a line on Chestnut Street to serve employees of the Moore shipbuilding plant.

Colorado Springs & Interurban Railway, Colorado Springs, Col.—An extension will be built by this company from its Broadmoor track to the Myron Stratton Home.

Columbus (Ga.) Railway.—The City Council of Columbus has asked the Columbus Railway to extend its Fifth and Sixth Street line to the Riverdale Cemetery, a distance of about ½ mile.

Chicago, Milwaukee & St. Paul Railroad, Chicago, Ill.—The electrification of the Chicago, Milwaukee & St. Paul

Railroad between Othello, Seattle and Tacoma will proceed to completion under the government regime. The Director-General of Railroads has approved an expenditure of \$5,346,606 for this purpose during the current year and an additional expenditure of \$2,811,035 is contemplated for 1919. It is estimated the project will be completed by July 1, 1919.

***Mount Carroll, Ill.**—It is reported that a company has been organized to construct an electric line between Mount Carroll and Freeport, with a probable extension to Rock Island. R. H. Campbell is interested.

Des Moines (Ia.) City Railway.—Work has been begun by the Des Moines City Railway on the reconstruction of its tracks on West Locust Street from First to Sixth Avenue.

Tri-City Railway, Davenport, Ia.—Work is now under way by the Tri-City Railway on an extension in Bettendorf and it is expected that the line will be completed by next fall.

Winnipeg, (Man.) Electric Railway.—It is reported that this company will install a Y at the western terminus of its Logan Avenue West line on Kee-watin Street.

Detroit (Mich.) United Railway.—Operation has been begun on the new line of the Detroit United Railway on Ferry Park and Linwood Avenues to the Joy Road.

Public Service Railway, Newark, N. J.—In connection with the development of the new townsite at Gloucester City by the New York Shipbuilding Corporation, plans are being made by the Public Service Railway for the construction of an extension to the new location.

Brooklyn (N. Y.) Rapid Transit Company.—Operation has been begun by the Brooklyn Rapid Transit Company on the Jamaica Avenue extension from Cedar Avenue, Richmond Hill, to Cliffside Avenue, Jamaica. The extension is double-track, with provision made for a center track to be constructed for the use of express trains at some future time. The line is operated by the New York Consolidated Railway, a subsidiary of the Brooklyn Rapid Transit Company.

Stark Electric Railroad, Alliance, Ohio.—It is reported that the Stark Electric Railroad is considering the extension of its electric railway service in Alliance.

Steubenville, East Liverpool & Beaver Valley Traction Company, East Liverpool, Ohio.—Plans are being prepared for the construction of a two-arch concrete bridge on Wells Avenue, to be built by the county, city of Wellsville and the Steubenville, East Liverpool & Beaver Valley Traction Company. The cost is estimated at about \$30,000.

Nipissing Central Railway, North Cobalt, Ont.—The Dominion Parliament has granted the Nipissing Central Railway an extension of time within which to construct a number of extensions on its branch lines.

Ottawa (Ont.) Electric Railway.—The City Council of Ottawa recently discussed the question of a proposed extension to Ottawa East and to the cemeteries, and a suggestion was made that in the event of the Ottawa Electric Railway refusing to make the extensions the Council enter into an agreement with the Hydro-Electric Power Commission to build them. It was stated that the extensions would probably cost \$800,000.

Port Arthur (Ont.) Civic Railway.—The City Council of Port Arthur has decided to reconstruct the line of the Port Arthur Civic Railway on Arthur Street between Court and Cumberland Streets. The 80-lb. rails at present on Hodder Avenue will be removed for placing on Arthur Street, and will be replaced with lighter rails.

Southern Pacific Company, Portland, Ore.—Physical connection between the Southern Pacific Company and the Oregon Electric Railway at Jefferson Street, Portland, is included in orders emanating from the Federal Railroad Administration requiring several connections between the competing roads in Oregon. Other connections between the Oregon Electric Railway and the Southern Pacific Company are ordered at Albany and at Eugene.

Quebec Railway, Light & Power Company, Quebec, Que.—Some small extensions in the city will be made by the Quebec Railway, Light & Power Company. The company is also having a survey made for the construction of a line on the Beauport Road, extending to the city limits.

Regina (Sask.) Municipal Railway.—Plans are under consideration by the City Council for the extension of the Regina Municipal Railway into North Annex.

Philadelphia, Pa.—Jerome Louchheim, president of the Keystone State Construction Company, and Joseph P. McCullen, the company's counsel on July 9 held their first conference with Mayor Smith and the other city officials with regard to annulling three subway contracts. No definite decision was reached and the matter has been referred to Director of City Transit Twining and the company's representative for more data in the expenditures already made by the contractors. The full amount involved in the contracts, as if completed, is about \$2,900,000.

Houston, Richmond & Western Traction Company, Houston, Tex.—The contract for the construction of the first section of the proposed line of the Houston, Richmond & Western Traction Company from Houston to Richmond has been awarded to Howard Kenyon, Houston, who has agreed to begin work within three months, accepting bonds of the company in payment. Right-of-way for the company's proposed line has been secured as far as Gonzales and will extend to San Antonio, touching the cities of Sugarland, Richmond, Rosenberg, Beasley, Shiner, Gonzales and New Berlin. Bonuses amounting to \$600,000 have

been raised in aid of the project by the citizens of the different towns and communities along the route. Ed. Kennedy, Houston, president. [Apr. 13, '18.]

Spokane & Inland Empire Railroad, Spokane, Wash.—A contract has been awarded to Grant Smith & Company, Seattle, for filling in the large trestle near Rosalia on the Spokane & Inland Empire Railroad. About 60,000 yards of material will be required.

Eastern Wisconsin Electric Company, Sheboygan, Wis.—It is reported that this company will construct an extension from Black Creek to Appleton this summer.

Shops and Buildings

Dayton, Springfield & Xenia Southern Railway, Dayton, Ohio.—A new office building will be erected by this company at the corner of Wayne and Phillips Avenues. The structure will be 35 ft. x 65 ft., two stories, and will be divided into a waiting room and offices for the president and general manager.

Power Houses and Substations

British Columbia Electric Railway, Ltd., Vancouver, B. C.—The new Point Grey substation of the British Columbia Electric Railway, Ltd., at King Edward Avenue and the Lulu Island tracks, is nearing completion. The new building is 100 ft. x 60 ft., of reinforced concrete construction and will take the place of a smaller temporary building on the same site. The new station will contain two 1000-kw. rotary converters and one 1500-kw. motor generator. Both air-blast and water-cooled transformers will be used and there will be the usual oil switches, lightning arresters and arc circuits. A new high-tension line between Earl's road substation and the Point Grey substation was recently put in operation, forming a second link with that from Main Street.

Humboldt Transit Company, Eureka, Cal.—Negotiations are under way by which the Western States Gas & Electric Company will furnish electrical energy requirements of the Humboldt Transit Company.

Pacific Electric Railway, Los Angeles, Cal.—The contract for the construction of a substation at Slauson Junction has been awarded by the Pacific Electric Railway to A. Nelson at \$3,341.

Shore Line Electric Railway, Norwich, Conn.—A new high-tension transmission line will be built by the Shore Line Electric Railway north from Norwich through the Quinebaug Valley to the Massachusetts line in the town of Thompson.

Maysville Street Railroad & Transfer Company, Maysville, Ky.—The new modern power plant of the Maysville

Power Company will begin operation during this month and the old power plant of the Maysville Gas Company will cease operation, being retained for some time as a reserve plant. The Maysville Street Railroad & Transfer Company and the Maysville Gas Company will in the future secure power from the new plant.

St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo.—Preparations are now being made by the St. Joseph Railway, Light, Heat & Power Company to guard against possible breakdowns in heating, lighting and railway service the coming winter. New boilers that will develop an additional 1000 hp., are being installed, and the capacity of the old boilers is being extended, by increasing the grate surface. New superheaters will be put in, and other equipment is on hand that will increase the efficiency of the service of the street railway company when placed under the heavy strain of the increased demands of cold weather. In addition to these improvements, numerous economies are being introduced with a view to increasing output and lessening cost.

Alabama Traction, Light & Power Company, New York, N. Y.—A 30,000-hp. unit will be added to its Warrior, Ala., plant by the Alabama Traction, Light & Power Company.

Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.—This company will complete within the next two weeks a short transmission line connecting its 45,000-kw. plant at Lowellville, Ohio, with the property of the Briarville Steel Company located between Youngstown and Gerard. This is a 66,000-volt two-circuit line. Seven-disk Ohio Brass insulators are being installed. The line feeds a 7500-kva. outdoor substation belonging to the steel company and a 9375-kva. substation belonging to the power company. This latter substation will interconnect with the 22,000-volt distribution system of the power company in the vicinity of Youngstown.

Philadelphia (Pa.) Rapid Transit Company.—Work has been begun by the Philadelphia Rapid Transit Company on the construction of a transformer building at Eightieth Street and Eastwick Avenue. The structure will cost about \$30,000.

Puget Sound Traction, Light & Power Company, Seattle, Wash.—A new Westinghouse 1000-kw. motor generator set has been installed by this company in its Ballard substation. A new 1000-kw. transformer bank is also being installed at its North Seattle substation which, when completed, will increase the transformer capacity of the station 100 per cent.

West Virginia Traction & Electric Company, Morgantown, W. Va.—This company has recently completed new extensions and improvements in its plant, including the installation of new stoker equipment in the power house and the erection of about 7 miles of new transmission line.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS

FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES • MARKET QUOTATIONS • BUSINESS ANNOUNCEMENTS

Effect of Copper Advance on the Electrical Market

Wire and Brass Increase—Other Articles May Follow According to Amount of Copper Used

Somewhat as a surprise came the increase in the official price of copper from 23½ cents to 26 cents. Already its effects are being experienced in the electrical line. Wire, always the first material to feel the fluctuations in the price of copper, advanced accordingly. Rubber-covered wire base advanced from 30 to 34 cents, weatherproof to 32 cents. Trolley wire has advanced 2 cents.

Brass has increased as a result of the rise in copper at least 2 cents a pound where quotations are being made. The settlement of labor disturbances, anticipated shortly, is expected to make for steadier prices in brass.

PRICE INCREASE PROPORTIONAL TO AMOUNT OF COPPER USED

Copper and brass enter into the make-up of many electrical commodities. The effect, however, will probably be proportional to the amount of the materials used. Thus where but a small amount is used and the proportion of the expense of this material to the total cost of manufacture is small there is little reason to expect an advance in the price of the finished article, unless this is the culmination of a series of higher costs which on the whole necessitate a wider margin of profit.

A number of items of electrical fittings using both copper and brass in a limited degree have advanced within the past few weeks, and it is rather doubtful if these will go any higher as a result of the government's action. The manufacturers, it is known, are well supplied with 23½-cent copper.

On the other hand, there are a number of articles on which the increased cost of copper and brass will make an appreciably increased cost of production, such as motors, generators, transformers, knife switches, controllers, brass connectors, bushings, nipples, cable connectors and others.

A number of these items have yet to raise their price to take care of the recent advance in freight rates. It would not be surprising, therefore, to see many more advances in price than have been experienced in the past few weeks.

Furthermore, there are no indications that copper may not go higher, even to 30 cents, in another month. The present price of 26 cents, which

it is well known is by no means satisfactory to producers, is made only until Aug. 15. Prior to that time two meetings are scheduled between the War Industries Board and the copper producers, and it is no secret that the latter will make a strong effort to get a better price than 26 cents.

Rising Prices in a Fluctuating Market

Advances on Railway Accessories Announced Since July 1—Changes Occurring Frequently

Prices of railway accessories while fairly stable are advancing gradually along the whole line. The market fluctuates weekly, so much so that on certain materials quotations are wholly withdrawn or withheld for date of shipment, when the current price prevails.

The raise in copper has affected every line of which it is a part. Trolley wire was marked up 2 cents a pound on July 3, and it is likely to go higher, according to the largest manufacturers. This figure is for immediate acceptance, else the quotation at shipment will be enforced. Price seems to be the last consideration, delivery being paramount. Copper may go to 28 cents a pound on Aug. 13. Brass is 2 cents a pound higher, effective July 3.

On all pound wire, including rubber covered, weatherproof, magnet and cable an advance of 3 cents a pound was announced on July 5. This is figuring on a 31-cent base, although there is a likelihood of the concern making these new prices going to a 34-cent base shortly. One of the leading companies, adhering to a 37-cent base, advanced its prices on all pound wire 2½ cents a pound. Braid has been marked up from 40 to 100 per cent on the various sizes. This is due to the higher cost of cotton, wax, paint, rubber, tin and labor, factors entering into the production of wire and cable.

Saturday last (July 6) rail bonds were advanced from 7½ to 10 per cent. Deliveries are from thirty to sixty days behind, but this is considered very good in view of current conditions.

Bell, register and trolley cords are now 86 cents a pound against 50 cents a year ago. The price has been steadily going up with each jump in cotton, the latest increase being made a few weeks ago, when a 5-per-cent rise went into effect.

As poles are sold f.o.b. delivered in accordance with the recent advance in freight, prices will be higher in proportion. Cross-arms are from 4 to 5 per cent higher.

Coal Output Maintained at High Averages

Increase of Bituminous Over 1917 Nearly 8 Per Cent—Maximum Production of Anthracite

From the weekly report, compiled by the United States Geological Survey, ending July 6, it is learned that the production of bituminous coal during the week ending June 29 not only exceeded the production of the week of June 22 by 455,000 net tons, or 3.8 per cent, but resulted in the second highest weekly production in history. The output (including lignite and coal made into coke) is estimated at 12,458,000 net tons as against 12,003,000 net tons during the week of June 22 and 11,583,000 net tons during the current week of 1917. The average production per working day is estimated at 2,076,000 net tons, an increase over the preceding week of 75,000 net tons or 3.8 per cent, and over the same week of 1917 of 145,000 net tons or 7.5 per cent. Increased shipments during the week ending June 29 were reported from all districts with the exception of central Pennsylvania and Alabama.

Anthracite shipments increased 471 cars during the week ending June 29, the total movement amounting to 41,641 carloads. The insistent demand for coal has created new and intensive methods of production. There is a possible means of supply found by working abandoned mines; robbing pillars of coal where it is safe; new devices installed in and about the mines for greater mining facility and more electric power used. Every means will be employed to maintain, if possible, a maximum output close to 270,000 tons of anthracite daily.

Mr. Dee Leaves Drouve

Resigns as Officer of Company at Bridgeport to Manufacture Ship Hardware

William V. Dee, secretary and general manager of the G. Drouvé Company, Bridgeport, Conn., maker of the Anti-Pluvius puttyless skylights and other products, has resigned to engage in business for himself and to be more active in helping to carry out and produce materials that will directly help the war program, by manufacturing, designing and selling ship specialties and ship hardware. In addition to an office and factory in Bridgeport, Mr. Dee has established an office in Philadelphia so as to be in close touch with the headquarters of the U. S. Shipping Board, Emergency Fleet Corporation.

Mr. Dee has a wide acquaintance among engineers, architects, contractors, steam railroad men and electric railway operators. While he retires as an officer of the Drouvé Company, Mr. Dee will retain his financial interest in the company. Mr. Dee became connected with Drouvé twelve years ago. Previous to that he was associated with the *Railway Age*, with which he began his career as office boy. From the position of office boy he was soon

advanced to a clerkship, then he became a solicitor of subscriptions; from that it was but a step to soliciting advertising. Finally he was made assistant manager of the New York office of the *Railway Age*. It was during his connection with that paper under Hugh M. Wilson that Mr. Dee built up his wide acquaintance among railway operators and the makers of railway equipment, among whom he is everywhere known as "Billy Dee."

Rolling Stock Market During First Half of 1918

Review of Orders Placed Show a Considerable Falling Off With Transportation of War Workers Influential in Bulk of Existing Market

Nothing is a better indication of the low level to which electric railway purchasing has fallen than recent rolling stock orders. Inability to secure funds has reduced traction companies to the state where even the smallest purchases are made with some hesitation. Increases in rates have not always produced the anticipated increase in revenue, while increasing operating costs are leaving less and less for up-keep or new equipment.

At this time each year the *ELECTRIC RAILWAY JOURNAL* reviews briefly the rolling stock purchases of the first half of the year and makes certain comparisons with the business for preceding years. The figures for 1918 are frankly disappointing. While it was known that rolling stock purchases had not been large, still it was not supposed that they had fallen off to such an extent.

A compilation of the orders reported by the *ELECTRIC RAILWAY JOURNAL* as having been placed in the first six months of 1918 reveal a total of but 676 cars for the United States and Canada. How these figures compare with former years can be seen from the following table.

	First Six Months.	Full Year.
1915.....	1,273	2,782
1916.....	2,224	3,942
1917.....	1,943	2,455
1918.....	686	

Should the conditions of 1916 and 1917 repeat themselves wherein the purchases in the second half of the year were considerably less than in the first half the 1918 total will be very sad indeed. However, it is somewhat reassuring to know that orders for 446 cars for four companies are now expected to be placed most any day. These orders include 300 cars for Boston, 100 for the Hudson Tube lines, twenty for Staten Island shipbuilding transportation and twenty-six for Seattle, Wash.

A segregation of the orders reported in the *ELECTRIC RAILWAY JOURNAL* for the first half of the current year shows that purchasing has fallen off in every section of the country and especially so in the central part of the country. Furthermore, the reports from Canada indicate that purchasing there has stopped.

The following table shows how the

rolling stock orders from different sections of the country and Canada for the first half year of 1918 compare with those for the first half of 1916 and 1917.

	1918	1917	1916
Eastern	534	954	1,257
Middle	84	580	805
Western	27	145	49
Southern	30	150	88
Canada	11	114	25
Total	686	1,943	2,224

These orders, it must be understood, are for new cars ordered from carbuilders only. No purchases of second-hand equipment are here included, although the market for used rolling stock has been very large. In fact, it is well known that many more second-hand cars could have been sold had they been available. Furthermore, these orders do not include rebuilt cars or cars built by the roads themselves. The figures do include a few storage-battery cars and a few snowplows.

It is difficult exactly to tell how many of each particular type of car have been ordered. There has been a demand for the one-man car, but not so great as existed last year.

Inquiries on safety cars are very brisk and in all probability a great many more orders would be placed if supplies were not believed to be limited. There are inquiries now for three cities, whose populations are 40,000, 300,000 and 250,000 respectively.

The only order for subway cars reported during the first half of the year was 100 cars for Brooklyn. In the first half of 1917, however, an order for 517 subway cars was placed. This single order as a matter of fact if deducted from the 1917 figures in the preceding table would bring the eastern orders for this period below the 1918 figures. Besides if subway orders are eliminated entirely the Eastern figures for the first six months of 1917 and 1918 would run 437 and 434 respectively, showing that so far as the East is concerned there has been comparatively little change in orders outside of the subway type.

Outside of the Brooklyn subway order the largest order placed so far in 1918 was for 100 cars for Philadelphia to take care of transportation of shipyard workers. Other notable orders include fifty-one cars for Newark, N. J.,

fifty for Washington, D. C., two orders for Wheeling, W. Va.,—one for twenty-nine cars and the other for fifty-two—and thirty cars for Buffalo, N. Y.

In looking over the rolling stock purchases, the bulk of the orders, it is noticed, has come as a result of increased transportation equipment needed to transport war workers. That other orders for the same purposes will be placed in the last half of the year there seems reason to believe. Most of the business came from the East, but now that the government intends to place more of its business in the Middle West, that section of the country should, as time goes on, find it more and more necessary to place rolling stock orders.

So long, however, as the financial situation remains in its present condition it is doubtful if electric railways will make any purchases other than those absolutely necessary.

Rolling Stock

Tidewater Southern Railway, Stockton, Cal., contemplates the purchase of an electric locomotive.

Waukegan Electric Light & Railway Company, Waukegan, Ill., is reported as having placed in service two new pay-as-you-enter cars.

Winnipeg (Canada) Electric Railway has ordered ten semi-steel, single-end motor cars from the Ottawa Car Company. They will be a departure from previous Winnipeg cars in many ways, including the use of cross seats and trucks with 26-in. wheels.

Knoxville Railway & Light Company, Knoxville, Tenn., is reported as having received nine new passenger cars of the metropolitan type, with a seating capacity of fifty-two. The cars have been on delivery for a long time, the delay of the car builders being caused by war conditions.

Cleveland (Ohio) Railway has just acquired twenty-five all-steel passenger cars originally built for the Rochester (N. Y.) Electric Railway. The rolling stock is of the Peter Witt front-entrance, center-exit, pay-as-you-pass type. Their cost was \$7,800 each, and they weigh 32,000 lb.

Terre Haute (Ind.) Electric Traction Company, which is leased to the Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., is reported as contemplating the purchase of thirty pay-as-you-enter cars for its city lines through the Car Trust Equipment Company. The City Council has authorized the company to place the order.

United Traction Company, Albany, N. Y., is rebuilding, remodeling and re-equipping eighteen of its open or summer rolling stock into closed cars. The design was furnished by Ernest Murphy, superintendent of equipment, and the cars are described by railway men as of a very handsome type.

When completed the cars are to be placed in operation on the company's Watervliet line.

Seattle (Wash.) Municipal Street Railway, through the Board of Public Works, Seattle, C. B. Bagley, secretary, will receive bids until July 12 for furnishing f.o.b. car builders' works, six single truck, double-end, safety motor passenger cars, equipped complete with air brake, including safety control features, also two motors with double-end control. The successful bidder will be required to file with the City Comptroller a bond for the full amount of the contract price. Each bidder must accompany his bid by a check for not less than 5 per cent of the total amount bid. Bids will be received on the same date and under the same conditions as above for furnishing twenty standard double-truck, double-end motor passenger cars, trucks arranged for four motors, multiple unit control, also straight-air brake equipment with automatic emergency feature, for use on the same railway. The officials are making every effort to improve the railway service.

New Advertising Literature

Barnes & Irving, Inc., Syracuse, N. Y.: Circular describing the Misener expanding rotary hack saw for cutting circular holes in metal, wood, slate, marble, etc.

Trade Notes

Atlantic Welding Company, New York, has changed its name to Lincoln Rail Welding Company.

J. R. Palmer, who had charge of the line material sales of the Ohio Brass Company, Mansfield, Ohio, for a number of years, is now in Philadelphia, where he will be engaged in naval airplane production work.

Electric Welding Company, Newport News, Va., has been incorporated with a capital stock of \$50,000. The officers are: William Schenstrom, president; Charles H. Peoples, secretary, both of Brooklyn, N. Y., and K. B. Johnson of Norfolk, Va., treasurer.

Railway Improvement Company, New York, announces that it has received an order for nine Rico terminal recorders from the Australian General Electric Company, for use on the lines of the Melbourne-Brunswick-Coburg Tramways Trust, Melbourne, Australia.

H. J. Pritchard, treasurer and director of the National Conduit & Cable Company, Inc., New York, N. Y., has been elected first vice-president of the company and placed in charge of operations. He is now virtually acting president, succeeding the late George F. Jackson.

General Electric Company, Schenectady, N. Y., has developed a small light line of portable testing instruments.

These consist of ammeters, voltmeters and wattmeters for both alternating and direct current circuits. They are designated as the type P-8 and are applicable to all commercial frequencies and wave forms without appreciable error. The instrument case with a window in the cover over the scale forms the carrying case.

Chicago (Ill.) Pneumatic Tool Company announces the appointment of L. C. Sprague as its special representative in connection with the sale of pneumatic tools to railroads. Mr. Sprague was formerly connected with the railroad department of the H. W. Johns-Manville Company, New York City.

Southern Car Company, High Point, N. C., bankrupt, will be sold at auction on Aug. 8 at 2 p. m. The trustee furnishes the following details of the property to be sold: A modern car plant fully equipped for the manufacturing of street and interurban cars, located in an ideal section for transportation, raw material and labor facilities. There are 15 acres of real estate, and eight buildings of 80,000 sq. ft. of floor space. The company has built cars for the leading railway companies of the country. The entire plant has some \$15,000 worth of supplies on hand. The property cost approximately \$180,000 seven years ago. For further information and a complete detailed inventory address W. A. Copeland, trustee Southern Car Company, High Point, N. C.

NEW YORK METAL MARKET PRICES

	July 3	July 10
Copper, ingots, cents per lb	26	26
Copper wire base, cents per lb	28½	30
Lead, cents per lb	8	8.05
Nickel, cents per lb	40	40
Spelter, cents per lb	8.87½	8.87½
Tin, Chinese*, cents per lb	92	92
Aluminum, 98 to 99 per cent., cents per lb	†33.00	†33.00

* No Straits offering. † Government price in 50-ton lots or more, f. o. b. plant.

OLD METAL PRICES—NEW YORK

	July 3	July 10
Heavy copper, cents per lb	22	23½
Light copper, cents per lb	19½	20
Red brass, cents per lb	19	22
Yellow brass, cents per lb	13	14
Lead, heavy, cents per lb	6½	7
Zinc, cents per lb	5½	5½
Steel car axles, Chicago, per net ton	\$41.52	\$41.52
Old carwheels, Chicago, per gross ton	\$29.00	\$29.00
Steel rails (scraps), Chicago, per gross ton	\$34.00	\$34.00
Steel rails (relaying), Chicago, gross ton	\$60.00	\$60.00
Machine shop turnings, Chicago, net ton	\$16.25	\$16.25

ELECTRIC RAILWAY MATERIAL PRICES

	July 3	July 10		July 3	July 10
Rubber-covered wire base, New York, cents per lb	34	30 to 37	Galvanized wire, ordinary, Pittsburgh, cents per lb	5.95	3.95
Weatherproof wire (100 lb. lots), cents per lb., New York	28½ to 34½	32.10 to 32.40	Car window glass (single strength), first three brackets, A quality, New York, discount	80%	80%
Weatherproof wire (100 lb. lots), cents per lb., Chicago	33.42 to 38.35	33.42 to 33	Car window glass (single strength, first three brackets, B quality), New York, discount	80%	80½%
T rails (A. S. C. E. standard), per gross ton	\$70.00 to \$80.00	\$70.00 to \$80.00	Car window glass (double strength, all sizes AA quality), New York discount	82 & 3%	82 & 5%
T rails (A. S. C. E. standard), 100 to 500 ton lots, per gross ton	\$67.50	\$67.50	Waste, wool (according to grade), cents per lb	11½ to 22	11½ to 22
T rails (A. S. C. E. standard), 300 ton lots, per gross ton	\$62.50	\$62.50	Waste, cotton (100 lb. bale), cents per lb	13 to 13½	13 to 13½
T rail, high (Shanghai), cents per lb	4½	4½	Asphalt, hot (150 tons minimum), per ton delivered	\$38.50	\$38.50
Rails, girder (grooved), cents per lb	4½	4½	Asphalt, cold (150 tons minimum, pkgs. weighed in, F. O. B. plant, Maurer, N. J.), per ton	\$42.50	\$42.50
Wire nails, Pittsburgh, cents per lb	3½	3½	Asphalt filler, per ton	\$45.00	\$45.00
Railroad spikes, drive, Pittsburgh base, cents per lb	4½	4½	Cement (carload lots), New York, per bbl	\$3.20	\$3.20
Railroad spikes, screw, Pittsburgh base, cents per lb	8	8	Cement (carload lots), Chicago, per bbl	\$3.34	\$3.34
Tie plates (flat type), cents per lb	2½	2½	Cement (carload lots), Seattle, per bbl	\$3.68	\$3.68
Tie plates (iraco type), cents per lb	7	7	Limeed oil (raw, 5 bbl. lots), New York, per gal	\$1.60	\$1.64
Tie rods, Pittsburgh base, cents per lb	2½	2½	Limeed oil (boiled, 5 bbl. lots), New York, per gal	\$1.60	\$1.65
Flash plates, cents per lb	2½	2½	White lead (100 lb. keg), New York, cents per lb	10½	10½
Angle plates, cents per lb	2½	2½	Turpentine (bbl. lots), New York, cents per gal	75	75
Angle bars, cents per lb	2½	2½			
Rail bolts and nuts, Pittsburgh base, cents per lb	4.90	4.90			
Steel bars, Pittsburgh, cents per lb	5	5			
Sheet iron, black (24 gage), Pittsburgh, cents per lb	4.90	4.90			
Sheet iron, galvanized (24 gage), Pittsburgh, cents per lb	5.80	5.80			
Galvanized barbed wire, Pittsburgh, cents per lb	4.35	4.35			

* Government price.

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The Eccentric
Drum

said the master mechanic of the Tidewater Power Company at Wilmington, N.C. which has fifty-four Peacocks.

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"An inspector goes over the brake chains and brake every morning, and then I give the outfit a try myself.

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addresses that you mention.

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ARE MADE RIGHT AND STAY RIGHT

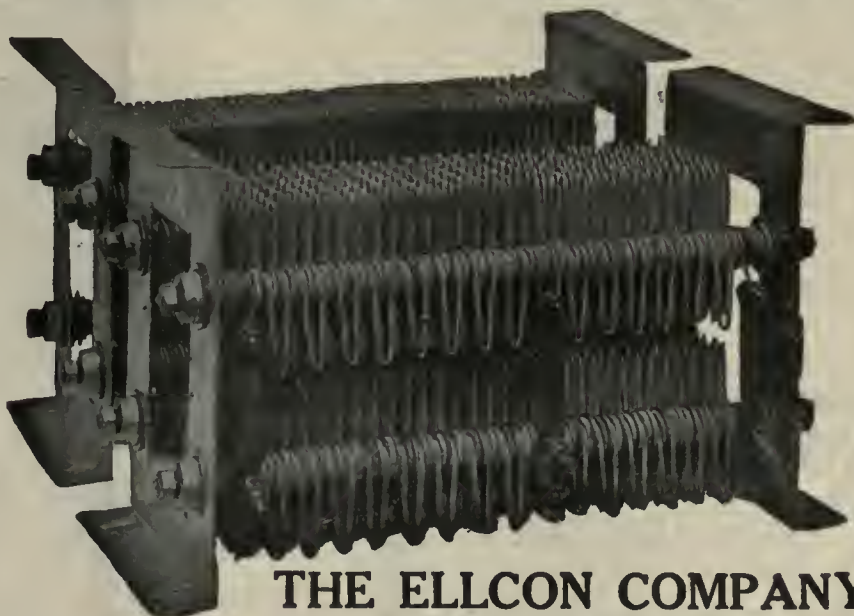
No resistors get more abuse than those under a car.

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Until the arrival of E M B drawn, non-corroding grid resistors, troubles from these sources seemed unavoidable.

E M B grid resistors actually have made this part of your equipment troubleproof.



THE ELLCON COMPANY
50 Church Street, New York



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It was placed in the tracks of the Dayton, Springfield & Xenia Southern Railway at a point where it would be subjected to the most severe use. Heavy cars at high speed have hammered this tie for **Six Years**. Its condition shows plainly—it's as good as when it was installed.



The 6-in. steel I-beam, shown here, has been in use for **Five Years** under a cross-over near a railroad crossing, where all cars run at reduced speed. It is merely **one** of a number similarly dented and hammered.

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THE DAYTON MECHANICAL TIE CO.

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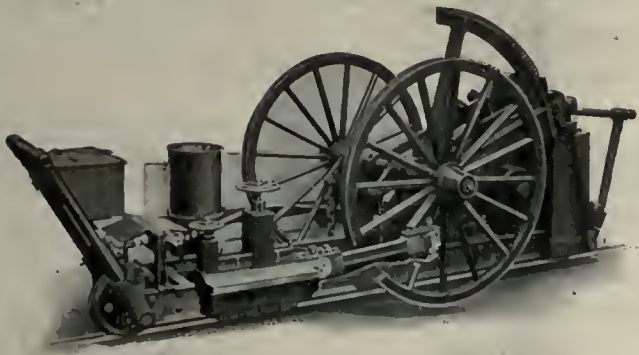
IN OUR recent advertisements we have been endeavoring to show by reference to reliable statistics the economies which are produced by the use of RECIPROCATING GRINDERS when figures are considered over a period of years. The statistics we have cited show very clearly that this question of track grinding is from the standpoint of the whole electric railway industry a matter involving policies which may lead to economies of

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IT IS no *small* matter. It is a very *big* one. There is, however, another viewpoint of importance. Regardless of questions of track economy every day that "bad spots" are permitted to stay in the track means an added burden to the rolling stock maintenance account. Because bad track builds up that account to a considerable extent. This consideration cannot be figured out in dollars and cents and it certainly does not involve such sums as are involved in track cost and maintenance.

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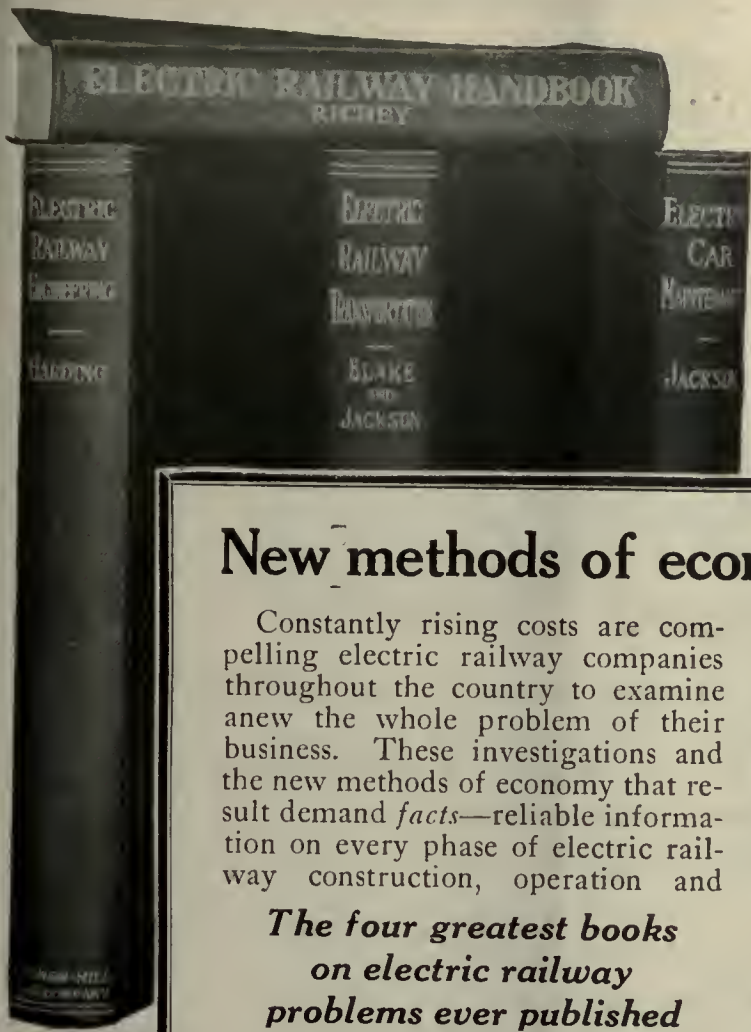
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What the books cover

The one book—the handbook—is pocket size with flexible binding, so that it may be carried about conveniently. It is an encyclopedia of electric railway construction, operation and maintenance.

Electric Railway Engineering is a thorough and practical manual on the broader engineering problems.

Electric Railway Transportation covers the business side of the subject—the relation of traffic to profits. It is packed full of priceless information on traffic conditions, their causes and their relation to electric railway efficiency.

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One of those standards is the character of the car cards.

Every card is carefully scrutinized so that the important characteristic points are forcefully conveyed to the car rider—whether the advertisement relates to men's fashions, to furniture, to candy, to moving pictures, or to any of the many other subjects advertised.

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INCORPORATED

Candler Building

220 West 42nd Street, New York City

Write Department
E. R. J. for Gear data

A large, detailed illustration of a massive gear, likely a pinion, dominating the left side of the page. To the right, a steam locomotive is shown pulling a passenger car along a track. The background features a landscape with trees and a bridge. The overall style is that of a vintage technical or industrial advertisement.

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You'll Get More and Better Service
Out of *VanDorn* Gears and Pinions

Continuous heavy hauling and steep gradients
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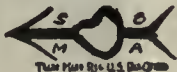
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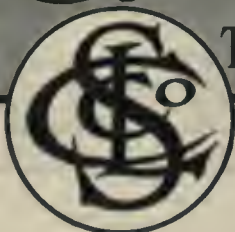
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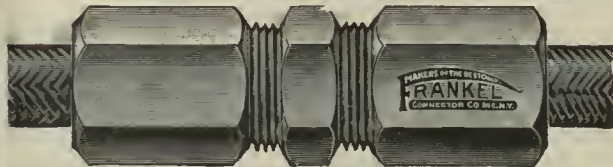
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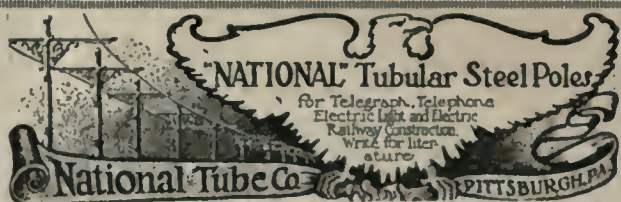
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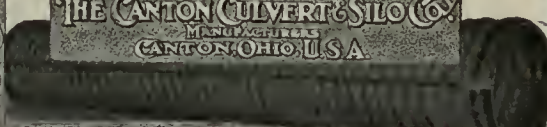
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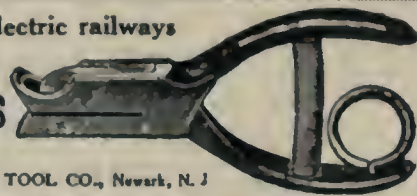
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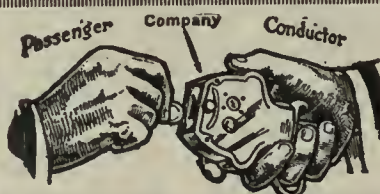
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2—Double-End, Single-Truck, one-man type, 4 ft. 8½ in. gage. Length of car body over bumpers, 31 ft. 4 in. Seating capacity, 32. Bottom frame all-steel construction. Trucks, Brill 21E. Wheel base 9 ft. 6 in. Total weight of car 18,000 lb. Double equipment of Westinghouse No. 514-A Motors. H.L.D. control.

1—Double-truck, one-man, P-A-Y-E type, 4 ft. 8½ in. gage. Length of car body over bumpers 37 ft. 3½ in. Length over corner posts, 27 ft. 3½ in. Underframe construction all metal. Total weight of car 33,000 lb. Trucks, Brill 27 M.C.B. Quadruple equipment. Westinghouse No. 306-CV-A Motors. Double and H.L. control. Automatic Westinghouse air brake equipment. Motor-driven compressor.

Interior View

Get Bulletin 237—78 Bargain Pages.

ZELNICKER
WALTER A. ZELNICKER SUPPLY COMPANY
St. Louis

Remarkable Offering

MISCELLANEOUS WANTS

Bridges Wanted

One through truss 100 to 150 ft. One swing span 160 to 180 ft. One bascule 80 to 90 ft. All bridges to have 16 to 20 ft. deck with provision for a 6 ft. sidewalk and designed to carry a 15-ton road roller. T. U. Fairlie, Hydro-Electric Power Commission of Ontario, Toronto, Canada.

POSITIONS VACANT

ACCOUNTANTS for position as chief clerk electric light and railway company in large Eastern city; give experience, salary, etc.; confidential. P-201, Elec. Ry. Journal, Philadelphia.

ARMATURE winder and electrician, familiar with general maintenance and capable of rolling stock; small road; 12 cars; give experience and salary. Married man preferred. P-198, Elec. Ry. Journal, Chicago.

ENGINEER—Wanted an electrical engineer to check up our various power losses, study car operation, test bonding, and other engineering and economy work, by an Eastern Pennsylvania railway system operating 200 cars, urban and interurban. Permanent position with good future. In replying, state age, family, education, experience and salary required. Address J. S. Avery, Reading Transit & Light Co., No. 12 South Fifth St., Reading, Pa.

FOREMAN. I am in need of a shop foreman for a 200 mile line and two small city lines. State wages expected in first letter. P-200, Elec. Ry. Journal, Chicago.

MASTER mechanic wanted by company operating 52 mi. of interurban railway and 9 mi. city railway. State fully experience, age, nationality and give references. Indiana Railways & Light Company, Kokomo, Indiana.

RATES:

1 inch—\$3.00
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27 inches— 2.60 an inch
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Rates for larger spaces furnished on application.

POSITIONS VACANT

MASTER Mechanic and General foreman for maintenance shop of large interurban company in Central West operating high speed cars with Type M control. Attractive salary. P-197, Elec. Ry. Journal, Chicago.

WORKING car barn foreman for a small street railway system in Colorado wanted. Man must be familiar with armature winding and competent to do and direct all car barn work. Address P-196, Elec. Ry. Journal, Chicago.

WORKING foreman for armature room wanted. Must be capable of winding all different types of street railway armatures. None but strictly sober man need apply. Please state salary expected. P-194, Elec. Ry. Journal, Philadelphia.

POSITIONS WANTED

MASTER mechanic desires position on medium sized road; can put run down equipment in high grade operating condition. PW-202, Elec. Ry. Journal, Cleveland.

MARRIED man, 41 years of age, 18 years of Steam, City, and Interurban Railroad experience, from conductor to my present executive position. Am desirous of making a change. Not particular about the kind of position should the salary and location be satisfactory. West preferable. PW-199, Elec. Ry. Journal, Cleveland.

SUPERINTENDENT of Rolling Stock and Master Mechanic now employed in charge of 350 city and interurban cars, for satisfactory reasons seeks opportunity to make a change. Married. Thoroughly experienced and can maintain equipment at high standard. PW-189, Elec. Ry. Journal.

SUPERINTENDENT OF CONSTRUCTION

seeks opportunity to make change for satisfactory reasons. Thoroughly experienced in track, power house and car barn construction, etc. Reference.

PW 203—Elec. Ry. Journal, Leader-News Bldg., Cleveland, O.

AGENTS AND SALESMEN

Salesman Wanted

Young man with engineering training, to sell steam and street railway track work. State salary expected and all details in first letter. AS-188, Elec. Ry. Journal, Chicago.

Little "WANT" cards
bring big results in the
Electrical Railway Journal

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25 Cycle, 550/600 Volts, D.C.

4—500 KW. Gen. Elec. Rotary Converter, type HC, form K, 600 Volts D.C., 834 amps. D.C., 4 pole, 750 RPM. With each rotary there are three 165 Kva. Gen. Elec. single phase transformers, type OI SC, 6600/5940 V primary, 430/286/143 V. secondary; also suitable switchboards.

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1—250 KW. General Electric Rotary Converter, type TC, form A, 3 phase, 4 pole, 550 V. D.C., 350 V. A.C., 750 RPM.

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MacGOVERN & COMPANY, Inc.

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- 3—200 kv.-a. General Electric, 60-cy., air blast type, 2200 volts prim., 370 secy.
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- 4—Westinghouse No. 305 Motors.
- 4—General Electric No. 203 Motors.

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Direct Current Belted Generator

1—500-kw., 550-V., 320 r.p.m. Cp. Wd. Westinghouse 3 bearing direct current generator.

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Electric & Mfg Co.

Write, wire or 'phone our nearest office, Pittsburgh, Pa., or 230 La Salle St., Chicago, Ill.

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- 125-hp. return tubular fire tube Boiler. A. D. Ward, Augusta, Maine. Age 25 years.
- 125-hp. return tubular fire tube boiler. Charles River Iron Works, Edward Kendall Sons, Cambridgeport, Mass. Age 25 years. 125-hp. 72-in. x 19-ft. 6-in. return tubular fire tube Boiler. Hodge Boiler Works, East Boston, Mass. Age 10 years.

CONDENSING ENGINE

- 1—500-hp. tandem, compound, Hamilton-Corliss, with left-handed belt wheel. Built by Hooven, Owens & Reutcher, Hamilton, Ohio. Size of engine, 22-in. x 42-in. x 48-in., 70-r.p.m. Size of belt wheel, 24-in. x 48-in., with jet condenser direct connected to the main crank, and feed water heater connected in the low pressure exhaust line. This unit is all complete, and is running order, belted to a line shaft with 133-ft. of 48-in. 2-ply leather belt.

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60-ft. of 6-in. and 6½-in.

ALTERNATOR

- 1—312-kw., General Electric, 60-cycle, 2300-volt, type A.T.B., 12—312—600, form B, 78 amps. Driving pulley, 29-in. diameter by 32 in. wide, with 49-ft. of 2-ply 31-in. leather belting.

CORLISS ENGINE

- 1—600-hp. cross compound condensing. Built by Robert Wetherell Co., Chester, Pa. Direct connected to a 400-kw. D.C., 550-volt, Crocker-Wheeler Ry. Generator. Size of engine, 18-in. x 36-in. x 42-in., 100-r.p.m., with a Blake steam driven jet condenser, and a feed water heater in the exhaust line. All in running condition.

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- 1—No. 23 White Star. Filtering capacity per day, 350-gallons.

FEED PUMPS

- 1—7½-in. x 4½-in. x 10-in.
- 1—7-in. x 5-in. x 10-in.

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- 1—125-hp. Cochrane Feed Water, Open.

STEAM PIPE

And fittings connecting engines to boilers.

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- 1—10,000-gallon Cypress.

FOR SALE

GE-80 and GE-67 MOTORS

with or without gears and gear cases.

Write

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SEARCHLIGHT SECTION

RECEIVER'S SALE

of Rockland, South
Thomaston and
St. George Railway

STATE OF MAINE
Knox, ss. Supreme Judicial Court
In Equity
Security Trust Company
vs.
Rockland, South Thomaston & St. George
Railway
and
Waldo Trust Company

Under and by virtue of decree in the above-entitled cause made on the twenty-first day of June, 1918, and filed in the office of the Clerk of Courts, Knox County, Maine, the undersigned Receiver, being thereunto duly authorized and directed, will receive bids in accordance with the terms and conditions of said decree, bids to be received by the Receiver at his office, 414 Main Street, Rockland, Maine, not later than twelve o'clock noon.

July 23, 1918

for the following property: All and singular, the real estate, buildings, road-bed, privileges, tracks, poles, lines, wires, material, machinery, equipment, tools, implements, supplies, property rights, easements, appurtenances and franchises, and all contracts and choses in action belonging to said Railway.

The aforesaid premises, property and franchises will be sold without valuation or appraisal. The Receiver will receive sealed bids for the property as an entirety or for any part or parcel thereof, as scheduled, with the right to reject any or all bids; each bid to be accompanied by a certified check for ten per cent. (10%) of the amount of the bid. Property will be sold free from all liens and claims of every character and of every name and nature whatsoever. No bid will be received by said Receiver from any person who shall not accompany his bid with a certified check for ten per cent. (10%) of the amount of the bid as a pledge and as part payment on account in case his bid is accepted. Deposits so received from unsuccessful bidders will be returned; that received from a successful bidder retained to be applied to the purchase price or forfeited in case the bid shall not be made good or the purchaser shall fail to comply with any order of Court relating to the payment for said property when and after said sale shall be confirmed; if sale not confirmed, deposit returned to bidder. Sale to be made subject to confirmation by the Court. Court reserves the right to re-sell the property in case the purchaser shall fail to make payment as required on confirmation of sale. Condition of sale more fully set forth in said decree, and title to be given in accordance therewith. All the above sold, condition and completeness as in; as seen and inspected; and as now located. By said decree all claims to said property and liens thereon are transferred to the funds derived from said sale, and the rights of all parties making such claims are to be adjudicated in the receivership proceedings and protected in the distribution of the funds. Brief schedule will be furnished by Receiver.

Dated at Rockland, Maine, June 21, 1918.

S. THAYER KIMBALL,
Receiver

TRUSTEES' SALE— STREET RAILWAY PROPERTY

Notice is hereby given that under and by virtue of that certain Decree of Sale, made and entered on the 26th day of June, 1918, by the Honorable Rhydon M. Call, Judge of the United States District Court for the Southern District of Florida, in Chancery, in that suit therein pending wherein Charles M. Allen is Complainant and

ST. PETERSBURG & GULF RAILWAY COMPANY

a Corporation, is Defendant, and the undersigned as Trustees under that certain Deed of Trust executed by said Railway Company on the first day of August, 1915, are Intervenor, the undersigned as such Trustees will sell, at the main office of St. Petersburg & Gulf Railway Company, in the City of St. Petersburg, Florida, on

MONDAY, AUGUST 5th, A.D., 1918

the same being a legal sales day, between the hours of 11 A.M. and 2 P.M., to the highest and best bidder, the property covered by said Deed of Trust, and described in said Decree of Sale, to-wit:

The following Rolling Stock, consisting of seventeen passenger cars, three work cars, one freight car, seven truck flat cars;

ALSO the following Track and Overhead, together with all wires, poles and fixtures, road bed ties, rails, franchises, rights of way, or otherwise, used in connection with said track and overhead equipment, as the same is now located over and upon and along the streets and portions of the City of St. Petersburg, Florida, and vicinity, the streets of Gulfport, Florida, and vicinity, and County Roads of Pinellas County, Florida; consisting of 26.55, more or less, miles of track composed of Davista & Jungle Line between Beach Drive and Sixteenth Street and between Sixteenth Street and Jungle; Gulfport Line between Central Avenue and Hooker Creek and between Hook Creek and Gulfport; Big Bayou Line between Fifth and Central Avenue and Hooker Creek on Third Street South, and between Hooker Creek and Big Bayou; Seminary and North Ninth Street Line between Second and Central Avenue and First Avenue North, First Avenue and Fifth Avenue North, and between Fifth Avenue and Seventh Avenue North, between Second Street and Ninth Street North, and between Seventh Avenue and 9th Avenue North on Ninth Street and between Ninth Avenue North and Southland; Coffee Pot Line between Seventh Avenue North at Second Street and Locust Street, and between Locust Street and Ball Park; Recreation Pier Line between Second Street at Second Avenue North and North end of Pier; Beach Drive Line between Second Avenue North and Central Avenue; Electric Dock Line between Beach Drive to end of dock; Sixteenth and Central Avenue Line to lighting plant; together with all turnouts, passing tracks, sidings and railroad crossings appurtenant thereto;

ALSO the following Real Estate in Pinellas County, Florida, to-wit: The North one hundred and fifty feet of water lot number Four (4) according to revised map or plat of the City of St. Petersburg, as the same is recorded in the office of the Clerk of the Circuit Court of Hillsborough County, together with the riparian properties and rights adjacent and connected with said lot on Tampa Bay, together with warehouse and waiting room;

ALSO water lot number one (1) according to the map or plat of Golf Course and Jungle Sub-Division filed May 18, 1916, in Plat Book No. 4, page 27, of the public records of Pinellas County, Florida, known as Jungle Dock;

ALSO water lot number five (5) of Boca Ceiga Park Subdivision, being the West two-thirds of Government Lot Number Two (2), and lands adjacent, all in Section 33, Township 31 South, Range 16 East, in the town of Gulfport, Florida, known as Gulfport Dock (the said Railway Company not yet having acquired complete title to said Gulfport Dock and being in possession thereof under contract), together with casino building at Gulfport, Florida;

ALSO that certain tract of land beginning at a point 660.4 feet south and 30 feet east from the Northwest corner of the Southwest Quarter of the Northeast Quarter of Section 24, Township 31 South, Range 16 East, and run East 150 feet to a point; thence turn 89 degrees 37 minutes to the left and run 87.9 feet to a point; thence turn 88 degrees 35 minutes to the left and run 59.75 feet to a point; thence turn 55 degrees 10 minutes to the right and along the inside edge of a concrete retaining wall 46.82 feet to a point; thence turn 1 degree 5 minutes to the left and run along the inside edge of said wall 72.7 feet to a point; thence turn 24 degrees 8 minutes to the left and run along the inside edge of said wall 27.4 feet to the intersection of the east line of Sixteenth Street, thence turn 121 degrees 39 minutes to the left and run South along the east line of Sixteenth Street 203.5 feet to point of beginning, known as car barn property, together with the car barn and cement pit;

ALSO all line department, track department, all track department tools, all car barn materials and equipment, all tools on hand at car barn; also fourteen armature cores; also one pair New Bedford Scales and two trucks; also one Hummobile and one Flanders Automobile; one lot of office furniture and fixtures, one electric-driven Burroughs Adding Machine; all of the aforesaid property being more particularly and in detail described in the Receiver's inventory thereof now on file with the Deputy Clerk of said Court at Tampa, Florida, and on file with Charles M. Allen, Receiver, at St. Petersburg, Florida, to which inventory reference may be had by intending purchasers;

Together with all licenses, patents, patent rights, processes heretofore owned by the said St. Petersburg & Gulf Railway Company on May 3, 1918, at the time the Receiver of said property was appointed, and also all corporate, municipal and other franchises, rights, easements and immunities which the said Railway Company or Charles M. Allen, its Trustee, enjoyed on the 3rd day of May, 1918, in connection with the aforesaid property; ALSO all property, real and personal, of every nature and kind whatsoever which the said St. Petersburg & Gulf Railway Company owned at the date of said Deed of Trust, to-wit, August 1, 1915, or which it has since acquired; together with all and singular the appurtenances thereunto belonging or in any wise appertaining; also the reversion and remainder; and also all the estate, right, title, interest, property, claim and demand whatsoever, as well as law as in equity, of, in and to any part of the aforesaid property.

That said property is being sold by authority of said Trust Deed and of said Decree to satisfy taxes and other Governmental liens outstanding against said property, such Receiver's Certificate as may have been authorized by said Court, costs and expenses of sale, including a reasonable attorney's fee for the undersigned, and to satisfy \$250,000 in bonds outstanding under said Deed of Trust.

That the successful bidder at said sale will be required to deposit with the undersigned the sum of \$15,000 in the form of a certified check, or otherwise, as indemnity against his said bid, in the event the same should be confirmed by the Court and not made good after such confirmation; that upon such sale being made the undersigned will duly report the same to the Court, and upon such sale being confirmed by said Court, the undersigned, as Trustees, will execute good and sufficient deed or deeds to the purchaser or purchasers of the said property.

THE PENNSYLVANIA COMPANY FOR INSURANCES ON LIVES AND GRANTING ANNUITIES

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EDWARD V. PECHIN, Trustees

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SEARCHLIGHT SECTION

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25
Side dump
Ballast Cars,
just rebuilt,
66,000 lb.
with
sideboards,
24 yd.

Have new boards, bolts, posts for all 25 cars. Standard gage; 24 ft. outside overall. Inside total 17 ft. Degree incline, 45 per cent.; over body, 22 per cent. Incline bottom, 3 ft. Flat bottom, 11 ft. Width overall, 8 ft. 10 in.; inside, 7 ft. 11 in.; rail to top, 7 ft., inside, 3 ft. Rail to top floor, 4 ft. Independent dump. Doors, 16 x 28 in. Westinghouse brakes. Steps and Grab Irons all M.C.B. standard. Four doors each side. Tower steel couplers, 5 x 5 shank. Total wheelbase, 19 ft. 4 in., 33-in. cast wheels, 9 x 11 wood bolsters. National hollow steel brake beams. 8 x 10 malleable journal boxes. Weight, 21,500 lb. Truck wheel base, 5-ft. twin full elliptic springs hung inside. 4 1/2 x 8 journal brasses. Cars take 42 ft. radius curve, coupled M.C.B. Painted; fine condition. Cash price, \$650 each.

ALSO

- 1—Good three-compartment Trolley Car, G. E. 57, 4 motors, 55 ft. long.
- 1—Snow Plow.
- 1—Steel underframe Trailer.
- 1—Edison-Beach Storage Battery Car, 8 wheels, 55 ft. long, four motors, steel underframe, modern, fine shape.
- 1—All steel Hall Scott Gasoline Three-Compartment Car, 60 ft. overall, fine shape, full swing Jauney couplers; \$7500. Act quickly.
- 15—Miles No. 9 hard drawn Copper Phone Wire, with porcelain and latest 50-A selective ringing Western Electric phones, with dispatchers, complete set for 15 station railway; has cabinet with more than 30 positions.
- 60—Miles Copper No. 10 Gage, with porcelains for immediate delivery, price 32c. a lb., Elkhart, Ind. Act quickly. Now selling.

Small way stations, car barns, scales, etc.

H. E. BUCKLEN, Receiver, Elkhart, Ind.

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OPEN and CLOSED
MOTOR and TRAIL

Write for Price and Full
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Sell your second-hand
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3—400-kv.-a. Westinghouse, oil insulated, self-cooled, cut door type, single phase

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60-cycle, 25,000-volt primary, 2500-volt secondary.
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100 ton 7-in., 70-lb. Shanghai Relayers.
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Full Stock, All Weights.

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Complete Armatures, New Armatures,
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Established 22 Years.

85 lb. A. S. C. E. Relayers

16,000 tons—with Angle Bars to match.
Available immediate shipment and centrally
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We positively own these Rails and offer
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Rails cut to length for structural purposes.
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L. B. FOSTER COMPANY
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60 Tons

7-in Girder Rails

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ROTARY CONVERTER

One Thousand (1000) kw., 6-phase, 60-cycle,
600-volt.

Also Three (3) 400-kv.-a.

TRANSFORMERS

1-phase, 60-cycle, primary voltage 13,000.

William T. Twomey, 111 W. Monroe St., Chicago

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Holden & White, Inc.

Alloys, Steel & Iron
Titanium Alloy Mfg. Co.

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Ohio Brass Co.
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Holden & White, Inc.
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Ohio Brass Co.
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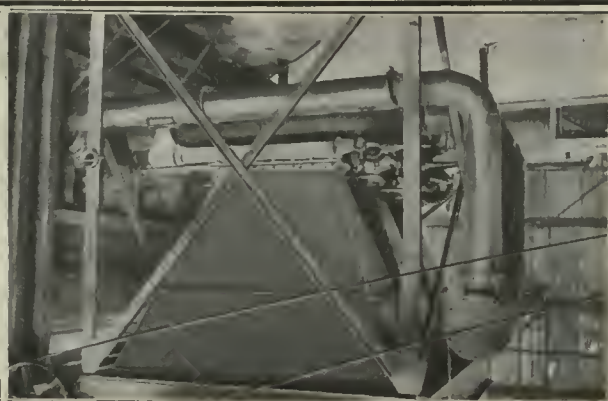
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Specify Titanium-Treated Rail for DURABILITY—



A battleship with blow-holes in its armor is not very dependable; nor a rail in which structure-weakening and life-shortening impurities have been allowed to remain.

The dependability—and consequently the durability—of Titanium-Treated rail is due to the fact that the metal is so thoroughly cleansed of all harmful elements that the finished rail is a uniform product of longer [life] and greater safety.

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makes its use for any important service obvious.

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Ball Bearings will eliminate your lubrication worries and save you money

It takes about half an hour to pack the journal boxes of a double-truck car.

Just that much labor and car-time wasted every few days.

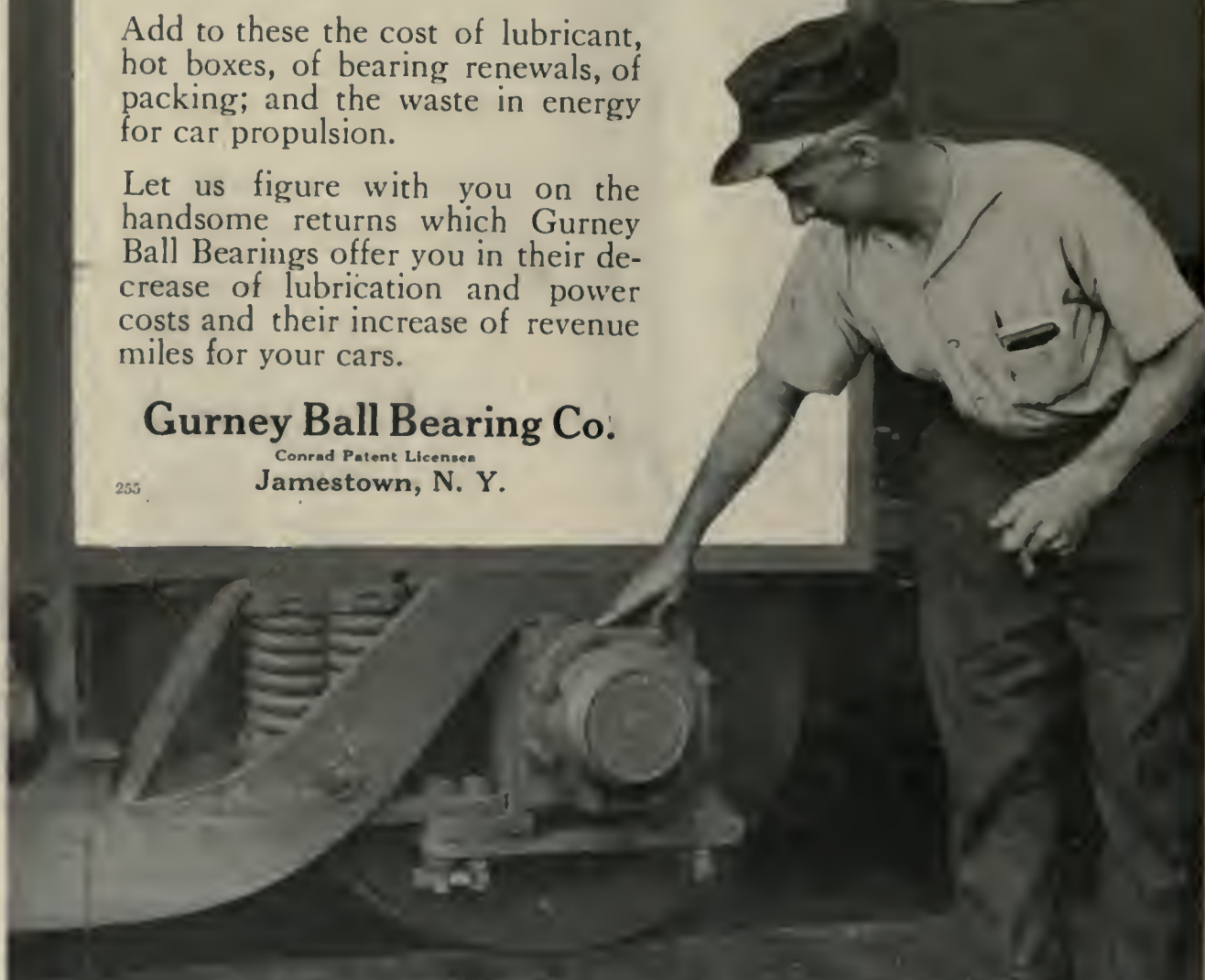
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Gurney Ball Bearing Co.

Conrad Patent Licensee
Jamestown, N. Y.

255



GURNEY



Peter Witt Cars for One-Man Service

AS everybody knows, the Peter Witt Car was originally developed to overcome a singularly congested central terminal and crosstown line situation in Cleveland and that it was successful to the extent of doubling the capacity of the terminal and cutting in half the time of stops at transfer points. It is also well known that car congestion at Toledo, Youngstown, Erie, Buffalo, Syracuse and Utica likewise has been reduced by this car. But perhaps everybody is not aware that in addition to being the foremost double-truck car for heavy traffic lines, the Peter Witt Car has the important advantage of ready adaptability to one-man operation—all that is necessary is to lock the center exit doors and move the fare box to the front platform. It is therefore unlimited in its scope of service in the double-truck, single-end, city or suburban car field. Information on any and every phase of the subject is ready to send to you.

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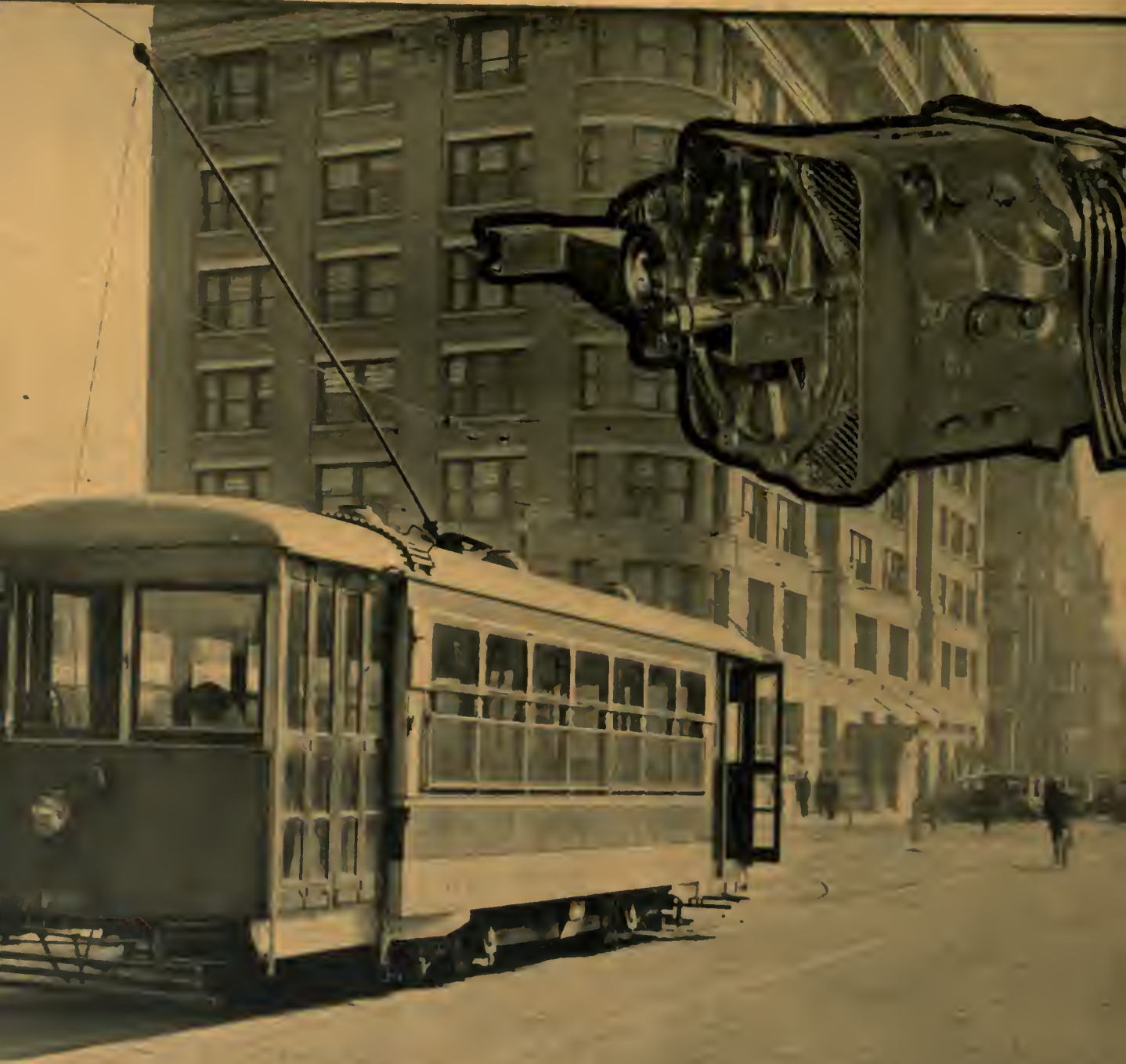
WASON MANUFACTURING CO.
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GE-258 Motor

On the Light-Weight Safety Cars
at Austin, Texas

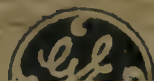
Like Fort Worth, Dallas and Houston, Austin, the capital of Texas, is practicing the gospel of More Service at Less Cost with the aid of the Light-Weight

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ELECTRIC RAILWAY JOURNAL

July 20, 1918



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PANTASOTE CURTAINS

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Fulfillment

"Joe," said the General Manager to the Superintendent, "I want to again review with you our plans for giving the public good service next winter. The newspapers are predicting another coal shortage. Are we doing everything possible to save coal while providing reliable service when cold weather comes?"

"We are right there," replied Joe, with a grin, "First, you know last week you authorized retiring 100 old motors. The new Westinghouse No. 532-B motors are promised for shipment in September.

"Second, we have placed orders for a good supply of repair parts, gear cases, and insulating materials, so we shall have them on hand.

"Third, the dipping and baking ovens are being installed in the shops now, and the dipping varnish is coming.

"Fourth, we have established the skip-stop system all over the city, making a considerable saving in coal, and giving better service.

"Fifth, we are revamping all our electric heaters in the cars, and preparing special heating instructions for the car crews. This will save more coal."

"That's splendid, Joe," remarked the General Manager, "We are fulfilling our purpose. I hope all other electric roads are doing the same."

Westinghouse Electric
East Pittsburgh



& Manufacturing Co.
Pennsylvania

Electric Railway Journal

H. W. BLAKE, *Editor*

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Circulation of this issue 7300 copies



Spies and Lies

German agents are everywhere, eager to gather scraps of news about our men, our ships, our munitions. It is still possible to get such information through to Germany, where thousands of these fragments—often individually harmless—are patiently pieced together into a whole which spells death to American soldiers and danger to American homes.

But while the enemy is most industrious in trying to collect information, and his systems elaborate, he is *not* superhuman—indeed he is often very stupid, and would fail to get what he wants were it not deliberately handed to him by the carelessness of loyal Americans.

Do not discuss in public, or with strangers, any news of troop and transport movements, of bits of gossip as to our military preparations, which come into your possession.

Do not permit your friends in service to tell you—or write you—"inside" facts about where they are, what they are doing and seeing.

Do not become a tool of the Hun by passing on the malicious, disheartening rumors which he so eagerly sows. Remember he asks no better service than to have you spread his lies of disasters to our soldiers and sailors, gross scandals in the Red Cross, cruelties, neglect and wholesale executions in our camps, drunkenness and vice in the Expeditionary Force, and other tales certain to disturb American patriots and to bring anxiety and grief to American parents.

And do not wait until you catch someone putting a bomb under a factory. Report the man who spreads pessimistic stories, divulges—or seeks—confidential military information, cries for peace, or belittles our efforts to win the war.

Send the names of such persons, even if they are in uniform, to the Department of Justice, Washington. Give all the details you can, with names of witnesses if possible—show the Hun that we can beat him at his own game of collecting scattered information and putting it to work. The fact that you made the report will not become public.

You are in contact with the enemy *today*, just as truly as if you faced him across No Man's Land. In your hands are two powerful weapons with which to meet him—discretion and vigilance. *Use them.*

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The Secretary of State
The Secretary of War
The Secretary of the Navy*

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This space contributed for the Winning of the War by

Westinghouse Air Brake Company, Pittsburgh, Pa.

SMOKE

The Enemy's Ally

WHEN American Industries take a holiday every week to save a million tons of coal to meet an emergency—

WHEN our Government tells us that we are wasting 120,000,000 tons of coal a year—

THEN it is time for us to face two big facts—

(1) This waste will not stop until we adopt better furnace methods and smoke prevention devices, and that—

The Westinghouse Underfeed Stoker is unsurpassed in the ability to burn fuels efficiently.

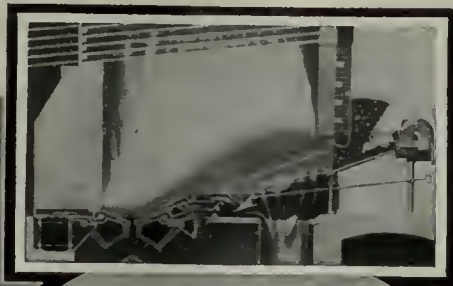
Every particle of combustible matter must pass upward, through the white-hot fuel bed, and the flame zone above. There is no possible way for the combustible matter to escape in the form of smoke before being completely and efficiently consumed, and transformed into available energy for turning the wheels of production.

(2) Just as sure as we are *collectively* responsible for this waste, just as surely the waste will not stop until we *individually* determine to fight inefficiency at our own back door.

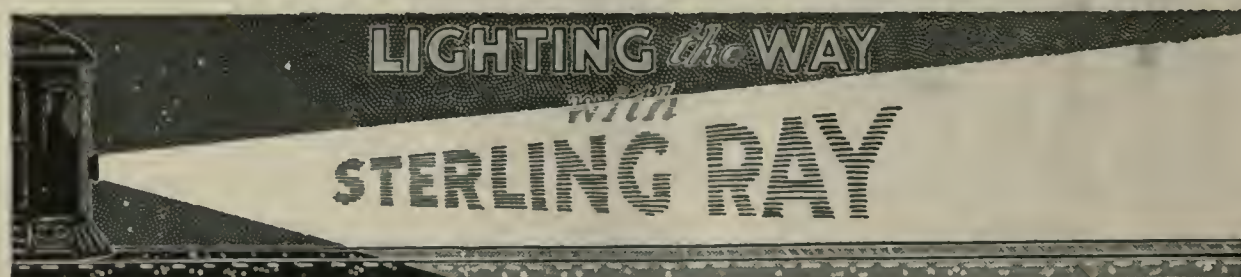
The back door of American Industries is the FURNACE ROOM.

Determine now to improve furnace methods—lest the iron heel of Autocracy crush us while we deliberate.

Westinghouse Electric & Manufacturing Co.
East Pittsburgh, Pa.



Westinghouse



Front View



Side View

Type ZP—Net weight 10 lbs.

A Sturdy Light Weight Headlight

The Imperial Type ZP Incandescent Headlight is compact and complete. Lightness is gained not at the expense of efficiency but from refined design.

It has a sturdy pressed steel case, a durable metal reflector and other valuable features.

Where streets are well lighted and bright illumination is not desired, the Type ZP is an excellent headlight. There are other types of Imperials for suburban and interurban service.

The Crouse-Hinds Imperial line is complete. It includes numerous different designs of Luminous Arcs, Carbon Arcs and Incandescent Headlights for any kind of service. Send for catalog.

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Quality First



O-B Type F-3 Bond (Patented).

Examine An O-B Bond

Quality Plainly Apparent

Take an O-B Stud Terminal Bond in your hands.

First of all you will notice the smooth finish of the terminals. They are milled accurately to size and each one is separately gauged by an inspector.

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As a result, under pressure they expand evenly to make a tight enduring contact.

The quality of the weld between strand and terminal is not visible. But it shows up none the less in service.

It has taken years of constant effort to bring O-B Bonds to this present perfected state. And their quality is being and will be maintained without let-up.

*Good Bonding saves money.
O-B Bonds are good bonds.*

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Gauging the terminals.



Welding the terminals.

(There is a homogeneous union between strand and terminal.)

"Get in the Clear," by using Phono-Electric



"What a true line," any line engineer will say on examining the overhead work of the Pennsylvania's 11,000-volt Philadelphia-Paoli electrification.

And it will stay true for years to come, despite

the almost incessant pounding from the current collectors of high-speed trains.

Because Phono-Electric is a contact wire that is hard enough to stay in line and yet not hard enough to crystallize.

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Bridgeport Connecticut

How to SAVE \$4300 per Mile

Wooden Ties

[Per 100 Feet of Track]

Int. Steel Ties

20 tie rods.....	\$17.00
50 ties	42.50
100 tie plates	45.00
100 lb. spikes	4.00
28.3 cu.yd. concrete.....	165.56
34 cu.yd. excavation.....	42.50

Total.....\$316.56

16½ steel twin ties.....	\$116.66
134 cast malleable clips.....	10.72
15 cu.yd. concrete.....	87.75
15.2 cu.yd excavation.....	19.00

Total.....\$243.13

Saved per 100 feet \$82.43

Saved per Mile of track.. 4352.30

And Besides: No tie rods; no tie plates; no cross bonds; narrow trench (7 ft. instead of 9 ft.); 50% labor saved in track construction below base of rail. Concrete foundations bear up well under heaviest traffic.

Ask us for proofs

INTERNATIONAL STEEL TWIN TIES

Prompt deliveries made from stock.

Permanent Track at Less Cost
Any Type Base — Open or Paved Track

The International Steel Tie Company

Manufacturers of Steel Twin Ties and Crossing Foundations
General Sales Office and Works: Cleveland, Ohio

REPRESENTATIVES:

Western Eng'g Sales Co., San Francisco, Cal.
Los Angeles, Cal. Seattle, Wash.

R. J. Cooper Co.
Salt Lake City, Utah

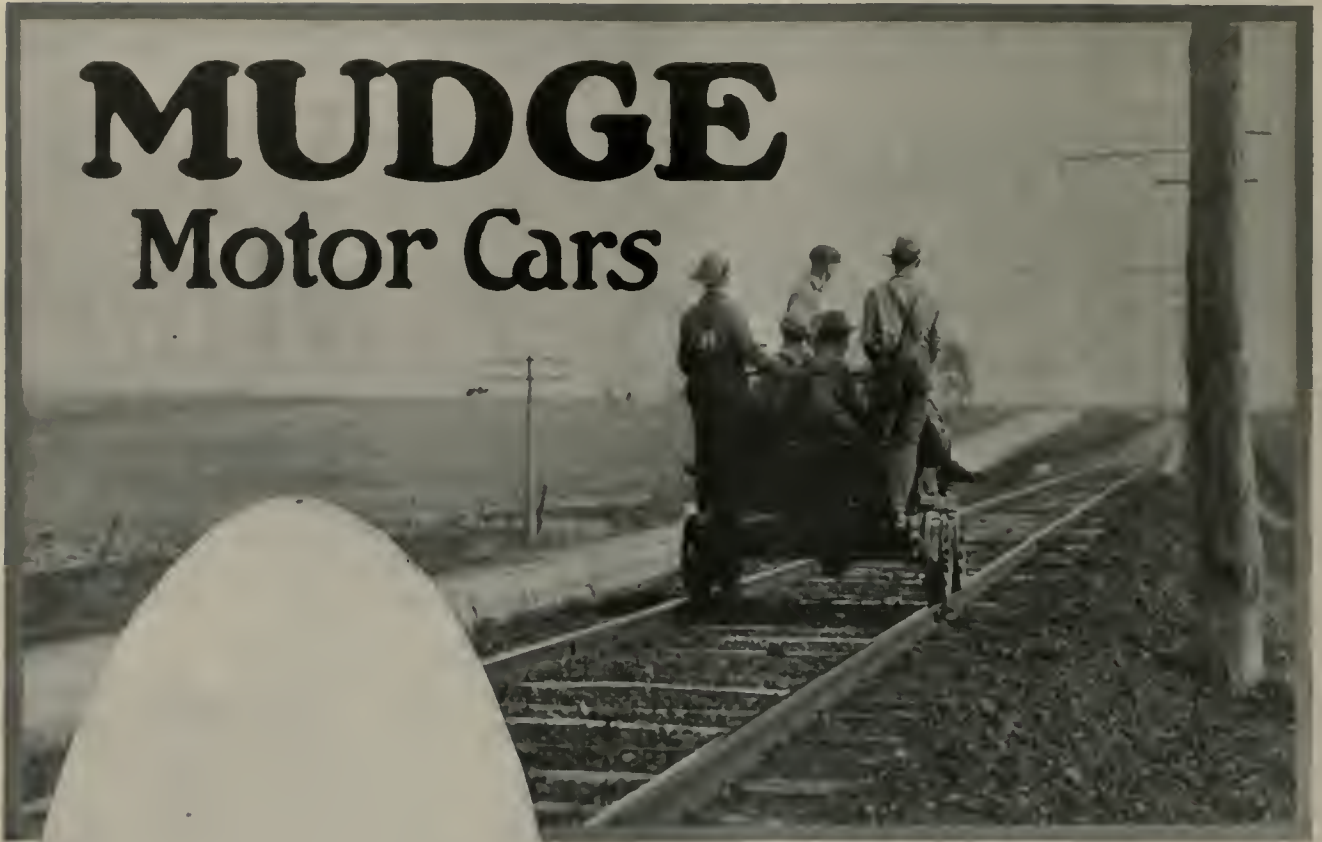
J. E. Lewia & Co.
Dallas, Texas

Maurice Joy,
Philadelphia

William H. Ziegler,
Minneapolis, Minn.

MUDGE

Motor Cars



One Man's Work That Doesn't Show on the Pay Roll

These two views show a nine-man crew. Yet because of the Mudge Section Motor Car on which they ride to and from the job they produce ten men's work.

How, you naturally inquire, can this be?

The answer is as simple as it is logical. Mudge Cars save an hour a day per man in electric railway service as compared with any other means of crew transportation. On the line of the Fort Wayne & Northern Indiana Traction Co., where these pictures were taken, this fact has been definitely established.

When you buy Mudge Cars you buy not only better crew transportation but increased crew efficiency.

Complete Catalog on Request.



Mudge & Company

Railroad Motor Car Specialists

467 Railway Exchange, Chicago, Ill.





What is expected of this Rail Bond?

Primarily, it must assure a return circuit of maximum electrical conductivity.

This track illustrated is bonded with

"Protected" Rail Bonds

They are specially designed to everlastingly perform this duty, because—

They have "Shot-Over" Sleeves which protect the strands from the effects of vibration where they emerge from the terminal.

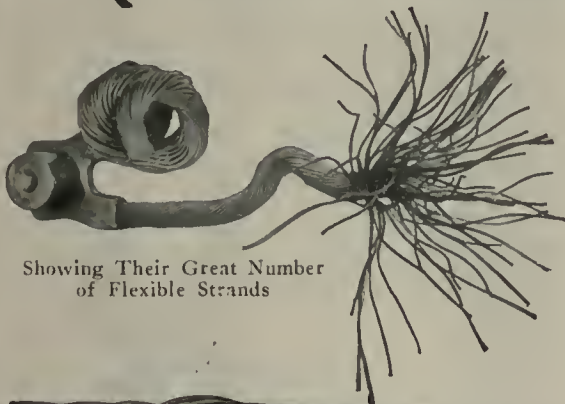
They have many strands of pure lake copper which further help to absorb vibration.

They have lugs of soft, pure, ductile copper which, as you know, is best for compressing into the rail.

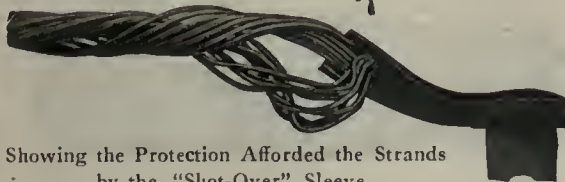
They form a broad line of bonds for every service.

Always use "Protected" Bonds.

Write for catalog.



Showing Their Great Number of Flexible Strands



Showing the Protection Afforded the Strands by the "Shot-Over" Sleeve

ELECTRIC SERVICE SUPPLIES CO.

Manufacturer of Railway Material and Electrical Supplies

PHILADELPHIA
17th and Cambria Sts.

NEW-YORK
50 Church St.

CHICAGO
Monadnock Bldg.

Canadian Distributors: Lyman Tube & Supply Co., Montreal, Toronto, Winnipeg.

The Largest Order for Slack Adjusters Ever Recorded

Operation

When brakes are applied, the strain on the threaded shaft is great enough to keep the brake-adjusting screw from turning. Therefore, when brake lever travel exceeds a distance predetermined by the adjusting finger, the fulcrum pin engages this finger and advances the rocker arm, which rotates the clutch sleeve only, in a right-hand direction.

When brakes are released, the brake adjusting screw is free to turn, so that when fulcrum pin engages the rocker arm and carries it back, the clutch sleeve, and brake-adjusting screw are turned as a unit in a left-hand direction, thus lengthening the connection and taking up the slack, if any.

To replace worn shoes, a wrench is applied to hexagon nut and brake-adjusting screw turned back sufficiently to give necessary slack. When the new shoes are in place, only enough slack need be taken up by hand to make the car safe to go on the road. The adjuster thereafter takes care of all adjustments until the shoes are worn out.

Philadelphia Orders 4298 Anderson Brake Adjusters

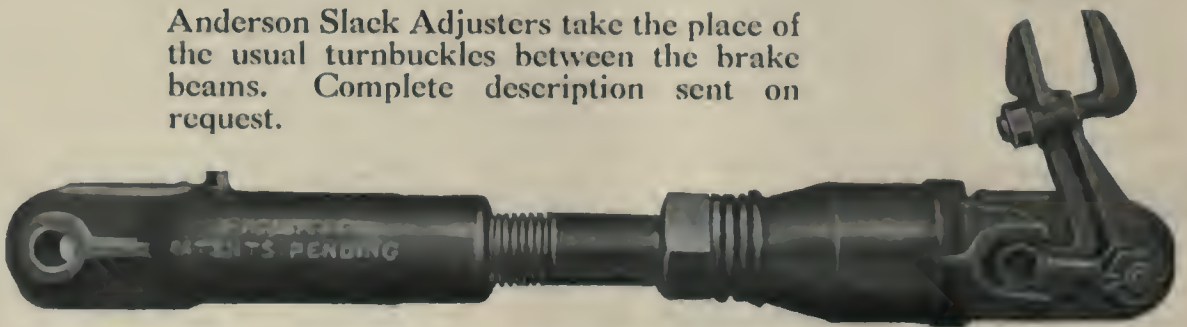
In February, 1913, more than 5 years ago, the Philadelphia Rapid Transit Company installed two Anderson Automatic Brake Slack Adjusters on Brill 39-E trucks. Experience showed that with these adjusters no adjustment of brakes was necessary during the entire life-time of brake shoes.

This test was made in competition with other brake adjusters and the Anderson Adjuster proved to be the most satisfactory type. Consequently this company ordered 4298 Anderson Adjusters, sufficient to equip 2149 cars.

The Company officials were convinced that the use of Anderson slack adjusters would greatly reduce labor previously necessary for inspection and adjustment of brake rigging, reduction in brake shoe wear, less wheel wear and less armature maintenance cost.

(These facts, based on an article in the Electric Railway Journal, March 30, 1918.)

Anderson Slack Adjusters take the place of the usual turnbuckles between the brake beams. Complete description sent on request.



Holden & White Inc.

817 Fisher Building, Chicago, Ill.

National Railway Appliance Co., New York and Washington; C. E. A. Carr Co., Toronto; W. M. McClintock, St. Paul; Alfred Connor, Denver; O. H. Davidson Equipment Co., Salt Lake City; F. F. Bodler, San Francisco; S. I. Wallis, Los Angeles.



Why are soldiers trench boots studded with steel?



Drawn from the product of Copper Clad Steel Co. Patented

Steel for strength, Copper for conductivity, and the following advantages over solid copper wire:

Less weight.

Higher elastic limit.

Smaller diameter for equal work, giving less projected surface subject to wind pressure and capable of supporting a sleet load.

And for the same cost you get much more Copperweld than solid copper.

Simply because a little steel which is *cheap* will do the work of a great deal of expensive leather.

The same idea is behind the use of the steel core in Aristos Copperweld Copper Clad Wire. It gives cheaply, the extra strength and life that costs so much to add in all-copper wire when diameter is increased beyond the actual electrical requirements.

We do not claim that Copperweld Wire can be universally substituted for solid copper, but when some of the conductance of a solid copper wire can be sacrificed for greater tensile strength, or where a steel conductor would be rapidly attacked by corrosion, Copperweld has important advantages.

The exact savings and efficiency improvements possible with Copperweld under any given conditions are easily figured. Our engineers are at all times ready to submit reliable data, advice as to where Copperweld should be used and copious evidence of the fulfillment of all claims.

Ask for our new 104-page illustrated book, "Aristos Copperweld Copper Clad Steel Wire."

PAGE STEEL & WIRE CO.

Established 1883 as Page Woven Wire Fence Co.

Makers of Copperweld Copper Clad Steel Wire; Armco Welding Rods and Electrical Wire; Wire Mill Products, Plain and Galvanized; Wire of Special Analysis; Wire Fencing for all Purposes; Factory Gates; Ornamental Iron Fence; Machine Guards; Tool and Stockroom Partitions; Architectural Iron.

FACTORIES: Monessen, Pa., and Adrian, Mich.

SALES OFFICES: 30 Church Street, New York

WESTERN REPRESENTATIVES: Steel Sales Corporation, Chicago





This shows actual condition of steel pole after being in service for seven years. Note weak and corroded portions.

**Overhead
is not
Disturbed**

Application easy—



A Drew Pole Sleeve is put in position, as shown above by placing the halves around the pole and driving in place. Very simple.



The above shows a Drew Pole Sleeve in place. This pole is now good for another twenty years.

Some actual figures—

Cost Replacing 650-lb. Pole:

New Pole	\$52.00	
Labor in Setting	8.50	
Hauling, etc.	extra	\$60.50

Cost Rejuvenating 650-lb. Pole:

1 Old Pole, junk.....	\$0.00	
1 Drew Pole Sleeve.....	8.80	
Labor, Material and Hauling.....	.70	9.50
Immediate saving per pole made by using Drew Sleeve Pole.....		\$51.00



Similar savings are within reach of every steel pole user. The method is simple and economical. Send for illustrated booklet. It will pay you to investigate.

We are manufacturers of line material exclusively.



The Mark of Quality

**DREW ELECTRIC &
MFG. COMPANY**

Offices and Works:

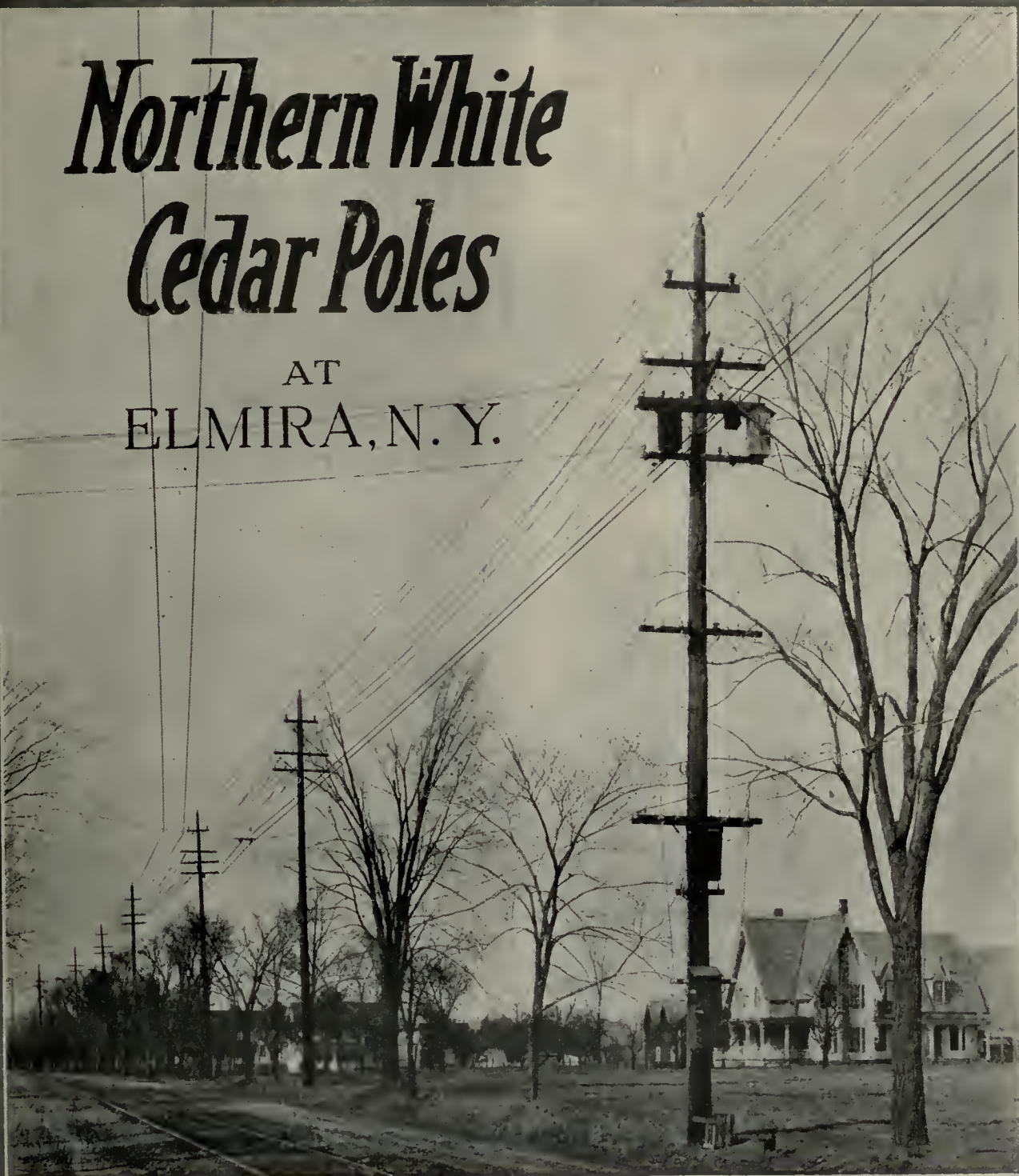
1016 E. Michigan St., Indianapolis, Ind.



The Mark of Quality

Northern White Cedar Poles

AT
ELMIRA, N. Y.



Elmira Water, Light & Railway Company Lines, 3 miles north of Elmira, N. Y.; built of Northern White Cedar Poles set 13 years ago; poles, 55 ft. They carry: One 11,000-volt line No. 2 wire; one 6600-volt line No. 2 wire; one 2300-volt line No. 4 wire; one 4/0 R.R. feeder; one pair of telephone wires; two 2/0 trolley wires; one 10-kw. series; 2 lighting wires; one No. 6 wire; lighting transformer with time switch; one set 6600-volt lighting arrester.

All the strength you want in a Pole is in Northern White Cedar. Light in weight, easily handled, transported, and erected. Good pole to work on—long life—low cost.

NORTHERN WHITE CEDAR ASSOCIATION
LUMBER EXCHANGE, MINNEAPOLIS, MINN.

Another User of

The MILLER Trolley Shoe

for City and
Interurban Service



Scores of Miller Trolley Shoes are now in use on this street railway in New England.

Miller Trolley Shoes have replaced 4.5-inch wheels on city lines.

Miller Trolley Shoes have replaced 6-inch wheels on the interurban lines—

Such as the 22-mile line on which the speeds run up to 40 m.p.h.

A report of our observer includes this significant comment:

"The Car Crews are enthusiastic about MILLER TROLLEY SHOES"

No wonder: the Miller Trolley Shoe hugs the wire under all conditions of speed, wind, and weather.

Miller Trolley Shoe Co., West Newton, Mass.

SPECIAL REPRESENTATIVE: Holden & White, Inc., Chicago

SALES REPRESENTATIVES

Alfred Connor,
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San Francisco, Cal.
W. F. McKenney,
Portland, Oregon.

W. M. McClintock,
St. Paul, Minn.



Elreco Tubular Poles

**For Permanence,
Beauty and Strength**

No matter how heavy or how complicated your overhead wiring may be, Elreco tubular poles will provide a support that time or the elements will not weaken. Wherever Elreco poles have replaced wood poles, there you will find overhead troubles reduced or eliminated. Years of continuous use will not affect their strength or rigidity. Elreco poles, once set, are permanent. They look better and wear better than other poles. Yet the installation cost is very low.

Cannot Telescope—Stand Any Wire Strain
Lowest Cost—Lightest Weight—Least Maintenance—Greatest Adaptability

Our "Wire Lock" Swedge Joint, shown at the right, positively prevents slipping and telescoping, without interfering with the strength of the joint. The joints are chamfered to keep out water and moisture and prevent rust.

Wherever used, Elreco street railway and street lighting poles have proved a remarkable success. Our catalog describes the complete line of Elreco electric railway supplies.



ELECTRIC RAILWAY EQUIPMENT CO.

CINCINNATI, OHIO

New York: 30 Church Street



The Inevitable Result

and

The Preventive



To neglect the grinding out of incipient corrugations and cupped spots in rails is just as certain to lead to bad track conditions and comparatively early replacement as the neglect of rust on an exposed steel structure is certain to lead to early destruction of the structure.

We all know that the periodic scraping and painting of the steel in bridges, viaducts and similar structures prolongs the life of the material and eventually saves a lot of money.

We know that wood or timber exposed to the weather requires regular painting to protect it from decay and such painting is also an eventual saving.

It must be at least equally clear that neglected bad spots in rails will go from bad to worse under the impact of rolling stock and that the regular use of a

RECIPROCATING TRACK GRINDER

to remove such bad spots is an eventual saving.

The profits and economies in the painting of structural materials, however, important and valuable as they are, are achieved only after a period of time by reason of the lengthening of the useful life of the material.

The savings developed by the use of the Reciprocating Grinder also pay handsomely after a period of years by prolonging the useful life of track *and in addition* pay an excellent continuous return in the decreased cost of track and car maintenance by removing one of the most prolific *causes* of damage to track foundation, loosening of bolts and joints, and injury to car equipment, wheels and tracks.

The use of Reciprocating Grinders pays a *continuous* as well as an eventual profit.

Railway Track-work Company

30th and Walnut Streets, PHILADELPHIA

AGENTS:

Holden & White, Inc., 343 S. Dearborn St., Chicago



"ARMCO" IRON CULVERTS

Require *FEW* Men

Even under the stress of increasing labor scarcity and labor costs, "ARMCO" Iron Culverts may be laid with speed and economy.

Note how well a few men are handling a large

section in the above illustration. Heavy tackle and skilled labor are unnecessary. This feature combined with "ARMCO" strength and durability makes it the economical culvert of the day.



Resists Rust

The triangle brand is your guarantee that they are made from **THE IRON THAT'S MADE TO LAST.**

Write the nearest manufacturer for full information on Rust-Resisting "Armco" Iron Flumes, Culverts, Siphons, Sheets, Roofing, and Formed Products.

Arkansas, Little Rock
Dixie Culvert & Metal Co.

California, Los Angeles
California Cor. Culvert Co.

California, West Berkeley
California Cor. Culvert Co.

Colorado, Denver
R. Hardesty Mfg. Co.

Delaware, Clayton
Delaware Metal Culvert Co.

Florida, Jacksonville
Dixie Culvert & Metal Co.

Georgia, Atlanta
Dixie Culvert & Metal Co.

Illinois, Springfield
Illinois Corrugated Metal Co.

Indiana, Crawfordsville
W. Q. O'Neill Co.

Iowa, Des Moines
Iowa Pure Iron Culvert Co.

Iowa, Independence
Independence Corrugated Culvert Co.

Kansas, Topeka
The Road Supply & Metal Co.

Kentucky, Louisville
Kentucky Culvert Mfg. Co.

Louisiana, New Orleans
Dixie Culvert & Metal Co.

Maryland, Baltimore
Maryland Culvert & Metal Co.

Massachusetts, Palmer
New England Metal Cul. Co.

Michigan, Bark River
Bark River Bridge & Cul. Co.

Michigan, Lansing
Michigan Bridge & Pipe Co.

Minnesota, Bay City
U. S. Bridge & Culvert Co.

Minnesota, Minneapolis
Lyle Corrugated Culvert Co.

Minnesota, Lyle
Lyle Corrugated Culvert Co.

Missouri, Moberly
Corrugated Culvert Co.

Canada—Canada Ingot Iron Co., Ltd., Guelph, Sherbrooke, Winnipeg, Calgary.

Montana, Missoula
Montana Culvert & Flume Co.

Nebraska, Wahoo
Nebraska Culvert & Mfg. Co.

Nevada, Reno
Nevada Metal Mfg. Co.

New Hampshire, Nashua
North-East Metal Culvert Co.

New Jersey, Flemington
Pennsylvania Metal Cul. Co.

New York, Auburn
Pennsylvania Metal Cul. Co.

North Dakota, Wahpeton
Northwestern Sheet & Iron Wks.

Ohio, Middletown
American Rolling Mill Co.

Ohio, The Ohio Corrugated Culvert Co.

Oklahoma, Shawnee
Dixie Culvert & Metal Co.

Oregon, Portland
Coast Culvert & Flume Co.

Pennsylvania, Warren
Pennsylvania Metal Cul. Co.

South Dakota, Sioux Falls
Sioux Falls Metal Culvert Co.

Tennessee, Nashville
Tennessee Metal Culvert Co.

Texas, Dallas
Wyatt Metal & Boiler Works.

Texas, El Paso
Western Metal Mfg. Co.

Texas, Houston
Lone Star Culvert Co.

Utah, Woods Cross
Utah Corrugated Culvert & Flume Co.

Virginia, Roanoke
Virginia Metal Corp.

Washington, Spokane
Spokane Culvert & Tank Co.

Wisconsin, Eau Claire
Bark River Bridge & Cul. Co.

CROWN RAIL BONDS

AS USED ON
CHICAGO SURFACE
LINES



Showing
Installation of 4/0
Solid Crown
Rail Bond
Applied Around
the Joint



Made by

American Steel & Wire Company

Chicago

New York

Cleveland

Pittsburgh

Denver

United States Steel Products Company

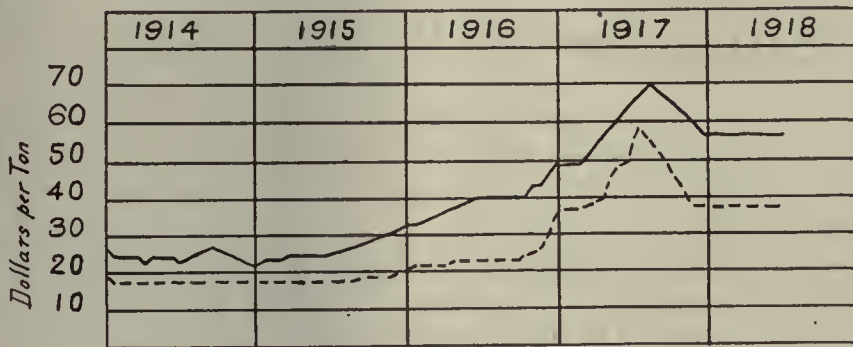
Pacific Coast Dept.: San Francisco, Los Angeles, Seattle, Portland

Export Departments: 30 Church St., New York

LINCOLN WELDER

To Meet Rising Costs—

The price of steel has soared—deliveries can only be promised “as soon as possible” labor is costly and hard to get.



Prices of Steel and Pig Iron 1914-1918

The Lincoln Arc Welder will help you to keep down your monthly maintenance expenses. It will save many times its own cost yearly in time, labor and material in your car-barns and on your tracks. It will repair cupped and broken rails, cross-overs and turn-out points. It will enable you to put back into service 90% of the worn and broken car equipment that is now rust-

ing on your scrap pile. It will save delays and speed up your car service.

Every rail that is replaced when it might be repaired—every defective pinion, axle cap and side frame which is renewed unnecessarily—is doing more than losing your company's money. It is holding back urgently needed steel from America's big job—crushing the enemy.

Our Bulletin 104-J Shows You What Others Are Doing.

The Lincoln Electric Co.

Cleveland, Ohio

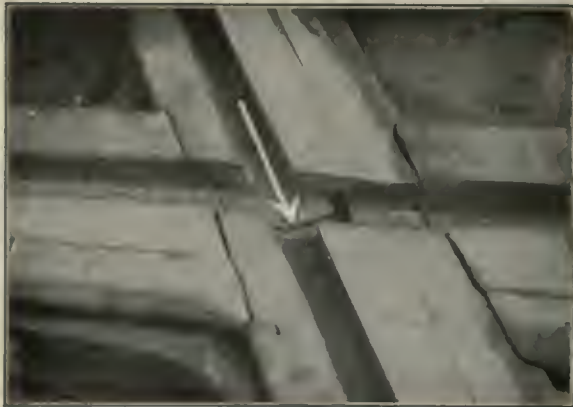
New York City
Buffalo
Syracuse
Boston

Chicago
Detroit
Columbus
Pittsburgh
Minneapolis

Philadelphia
Charlotte, N. C.
Toronto, Canada
Montreal

Agencies in other principal cities





What Happens to a Rolled Rail Crossing



Joints in Balkwill Articulated Cast Manganese Crossings are life savers. They positively prevent breakage at flangeway intersections, permitting 100% wear before renewal

Why Balkwill Articulated Cast Manganese Crossings Are Superior to Rolled Rail Crossings

This picture at the left shows where breaks in the main steel filling or backbone of rolled rail crossings are usually found.

These breaks are unavoidable because of the lack of flexibility of the rolled steel filler at the flangeway intersection.

In the Balkwill Articulated Cast Manganese Crossing the difficulty is

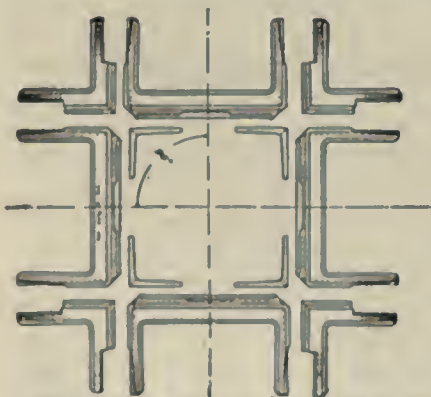
corrected by placing scientifically designed joints at the very places where breakage formerly occurred.

The lower first cost of a rolled rail crossing is therefore not a lower overall cost because it takes several rolled rail crossings to equal the life of one Balkwill Articulated Cast Manganese Crossing. Therefore the Balkwill Crossing is the cheapest in the long run. It gives

MORE WEAR PER DOLLAR THAN ANY OTHER CROSSING YOU CAN BUY

It saves interruptions to traffic, makes less demand on labor, which is now so scarce, and also reduces the cost of making replacements frequently.

Write us for data on existing installations. If your special work manufacturer cannot get prompt deliveries of manganese castings or has not taken out a license to manufacture these crossings, **DON'T ACCEPT A SUBSTITUTE** but write us direct and we will see that your requirements are taken care of.



Joints at the flangeway intersections of Balkwill Articulated Cast Manganese Crossings positively eliminate breakage

**Order Balkwill Articulated Cast Manganese Crossings
Direct from Your Special Work Manufacturers**

The Balkwill Manganese Crossing Co.

506 Williamson Building, Cleveland, Ohio



Shows how many minutes the Power is on.

Counts how many stops and slowdowns are made.

Cutting out waste of power by improving boiler-room and power-plant methods and equipment is fine—and saves money.

Cutting out waste of power by skillful designing of cars to eliminate excess weight is also essential—and saves money.

But you are never going to reduce your power cost to the minimum for a given service until you cut out the waste at the point of use—*on the car*.

When your motormen continuously operate cars over a given run on a given schedule with the least possible amount of power necessary to maintain that schedule then—and not until then—will you have eliminated the chief waste of power.

And the motorman cannot get the *best* results without the coöperation of his conductor. And you cannot successfully train and educate car crews to the use of minimum power without an automatic and reliable means of recording individual and crew efficiency.

The Arthur Power-Saving Recorder provides that means

It is simple—inexpensive—reliable—easy and economical to install and maintain.

It shows exactly how many minutes power is on during a run or day and whether the brakes are used roughly and to excess. It therefore provides an exact basis for determining the relative efficiency of car crews.

It requires no use of live wires—no switches—no resistances—no shunts.

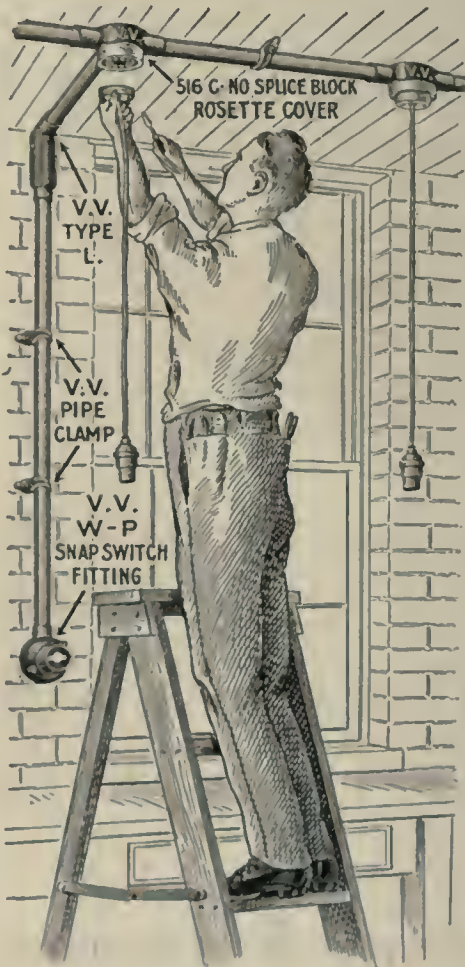
It conserves power and car equipment. Checks waste. Insures safe, careful car operation.

It has *proven* its value.

The Arthur Power-Saving Recorder Co.
Second National Bank Building, New Haven, Conn.

V. V. NO SPLICE BLOCKS

FOR EASY, QUICK WIRING



Time today is worth more than money and quick wiring devices are absolute necessities for your wiremen, to enable them to produce efficient results.

Spliced joints are not only laborious but also uncertain and where reliability is imperative the installation of

V. V. NO SPLICE BLOCKS

Solves the question of grounds, short circuits and miscellaneous troubles.

NO TORCH, NO SOLDER, NO RUBBER AND NO FRICTION TAPE is required to install drop lights, receptacles, nipple cover outlets, etc. All wires are fastened directly to the V. V. No Splice Block, making a neat, compact installation. Exceptionally easy to connect—lots of room to work, as all connections are made on the surface and not inside of the fitting. Does away with looping, and short ends of wire may be used up in wiring from outlet to outlet.



Blank and
One Hole
Rosette Cover



2, 3 or 4
Hole Cover



Male or
Female
Nipple Cover



613—Receptacle



Any style of cover or receptacle can be mounted on the V. V. No Splice Block after connections have been made and which can be changed at any time without disconnecting or reconnecting any wires. The V. V. No Splice Block fits directly on the No. 1 size Type 5 Series V. V. Fittings, and our complete catalog and information will be mailed free upon request.

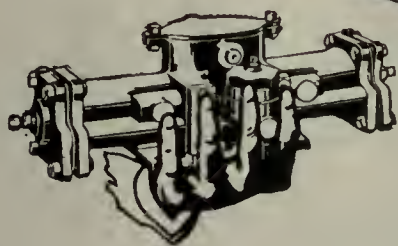


V. V. FITTINGS COMPANY

PHILADELPHIA, PA., U. S. A.

NEW YORK

CHICAGO



National Pneumatic Door and Step Control at Detroit for the World's Heaviest Street Railway Train Service

Satisfactory train operation over a city street which is second only to the Interborough Subway, New York, is largely a matter of keeping the standing time per stop within reason—

And this can be accomplished only with pneumatically-operated doors which enable the conductors to give the go-ahead signal quicker than would be possible otherwise.

Hence the **National Pneumatic** equipments installed on center-entrance trailers by the Detroit United Railway have proved a most important factor in the successful train operation of that system.

NATIONAL PNEUMATIC COMPANY

INC.

50 Church St. New York



515 Laflin St. Chicago

TURBOGEAR

FAST PATENTS

In a Railway Power Plant, where maximum power must be secured and *maintained* to give the proper service to the public, the system of mechanical power transmission is of the utmost importance.

The Turbo-Gear is the safest, most compact, most efficient, most economical and most *reliable* of any method yet devised to transmit power mechanically.

The Turbo-Gear is directly coupled to the prime mover and driven unit. It may be used either as a "step up" or "step down" speed transformer.

It requires small floor space, costs practically nothing for upkeep and ensures absolute dependability in power transmission.

The Turbo-Gear is built for long and satisfactory service under the most severe conditions.

The Turbo-Gear is particularly well adapted for turbine driven pumps, fans, condensers, stokers, etc., and for motor driven pumps, fans, coal handling and conveying machinery.



Write today for Bulletin 100, which explains why you should install Turbo-Gear.



Turbo-Gear direct connected between Terry Turbine and Taylor Stoker. 25 H.P. Speed reduction 3500 to 500 R.P.M.

The Poole Engineering & Machine Company

Manufacturers of Gears and Power Transmission Machinery Since 1843

Baltimore, Maryland, U.S.A.

BOSTON.....53 State St.
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DALLAS.....1405 Southwestern Life Bldg.
DENVER.....First National Bank Bldg.
DETROIT.....423 Dime Bank Bldg.
EL PASO.....1028 Mills Bldg.
JACKSONVILLE.....821 East Bay St.
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Engineering Company of Canada, Montreal

NEW YORK.....50 Church St.
PHILADELPHIA.....929 Chestnut St.
PITTSBURGH.....781 Union Arcade Bldg.
SALT LAKE CITY.....218 Judge Bldg.
SAN FRANCISCO.....503 Mission St.
SAVANNAH.....20 Bay St., West
SEATTLE.....2012 L. C. Smith Bldg.
ST. LOUIS.....2211 Olive St.
SYRACUSE, N. Y.....504 City Bank Bldg.



Dubuque Installs ECONOMY METERS

because

**They meter the
ENERGY and
that's what the
management
wants to save**

The Dubuque Electric Company of Dubuque, Iowa, is equipping all its active cars with Sangamo ECONOMY Meters following an engineering study in which it was found that very substantial savings in car propulsion energy could be effected. The Dubuque Management, in its energy-saving campaign, will meter the energy because that's what it wants to save—and car motor energy consumption is the correct relative measure of the motorman's efficiency.



The dial of the ECONOMY Meter shows the motorman just how much energy he uses.

He knows that by saving energy he saves money, and few men are willfully wasteful.

Because the ECONOMY Meter measures what he is trying to save, the motorman can satisfy himself as to the most economical methods of operation.

His interest is held and he *does* save.

These fundamentals underlie the success of the ECONOMY Meter.

This device on your cars will speedily pay for itself in the savings it effects.

Let us send you our illustrated booklet describing it.



"The Watchdog of Your Power"

Economy Electric Devices Co.

L. E. Gould, Pres.

Exclusive Sales Agent

Sangamo Economy Railway Meter
Old Colony Bldg., Chicago

Illustration shows remodeled Frankford Arsenal Boiler House. Dotted lines show outlines of original roofs. The new monitor contains a coal bunker and conveyor supplying all the boilers.



We Remodel Old Boiler Houses

It is often feasible to remodel existing boiler houses to take modern coal and ash handling machinery.

The labor saved by the change earns a highly profitable return on the investment; and the resulting independence of labor shortages is doubly welcome in times like the present.

We are altering a number of boiler houses now. Send us a sketch of your power plant layout and we will tell what can be done with it and the approximate cost.

We handle the entire job under one contract and deliver it in running order with our guarantee.

Catalog 33 tells something about our work.

R. H. BEAUMONT CO.

111 S. 5th St., Philadelphia, Pa.

New York, 50 Church St.
Boston, 141 Milk St.

*Specialists for 25 years in Coal, Ashes and Coke
Handling Equipment for Boilers and Gas Houses.*

Beaumont
ONE CONTRACT
ONE RESPONSIBILITY

New Brighton, N. Y.

Around the Continent on

Hale and Kilburn Seats

From New York to San Francisco, and all the way from North to South, Hale and Kilburn Seats are in street railway service.

Here we have the newest types in the improved cars of the Richmond Light & Railroad Co. at New Brighton, N. Y.—serving both passengers and company in a highly mutual way. The riders get comfort; the company gets satisfaction.

Hale and Kilburn Walkover Seats are neat and trim, with every line and detail reduced to a simplicity that at once removes unnecessary weight and assures comfort. Every part is of steel. The cushions are longer, the action of the back is easy and the grip handles are designed for practical safety. For the utmost in comfort, strength, durability and low cost service—H and K Pioneer Walkover Seats.



Hale and Kilburn Corp.

Philadelphia
Washington

New York
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out privateers—and almost over-night Providence changed from a hustling, bustling seaport to a throbbing industrial center.

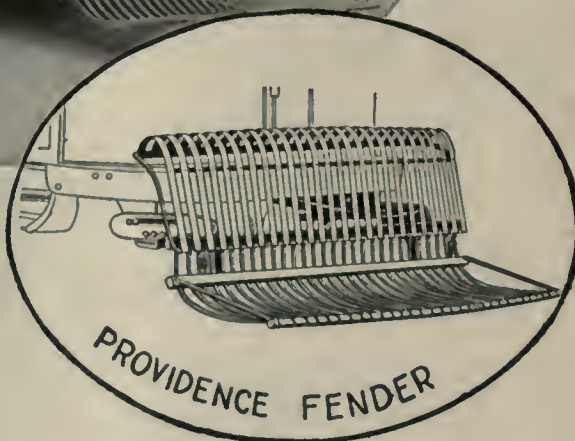
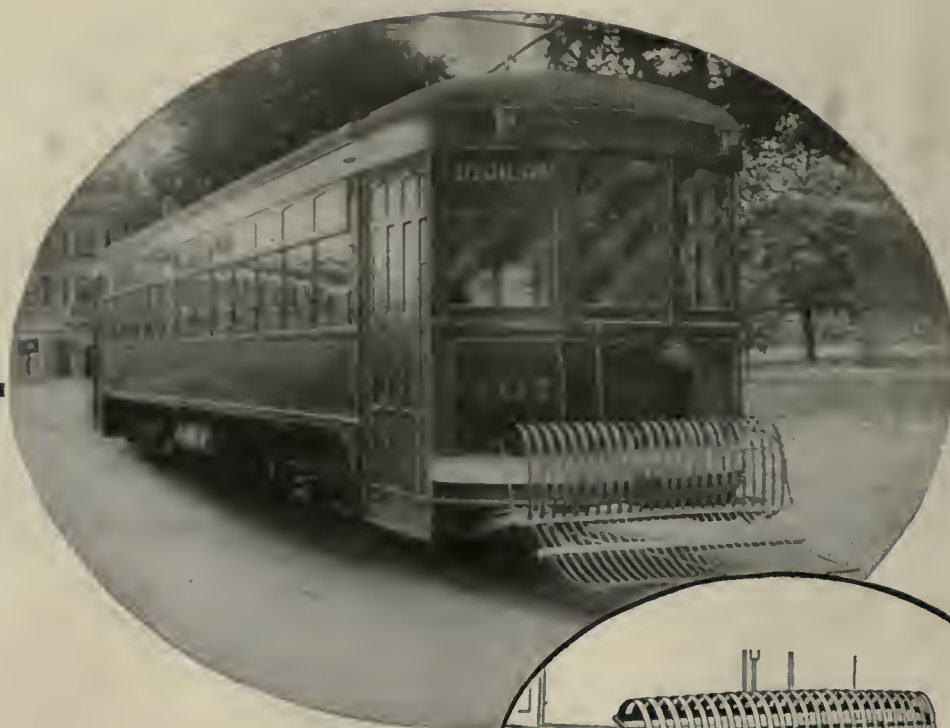
Hordes of foreign immigrants flocked to the great factories; the city spread out rapidly and soon covered many square miles within its far-flung suburbs, where the thousands of working men sought and found homes for themselves and their families. Electric railways were built along many of the streets and avenues to carry the men to and from their work and

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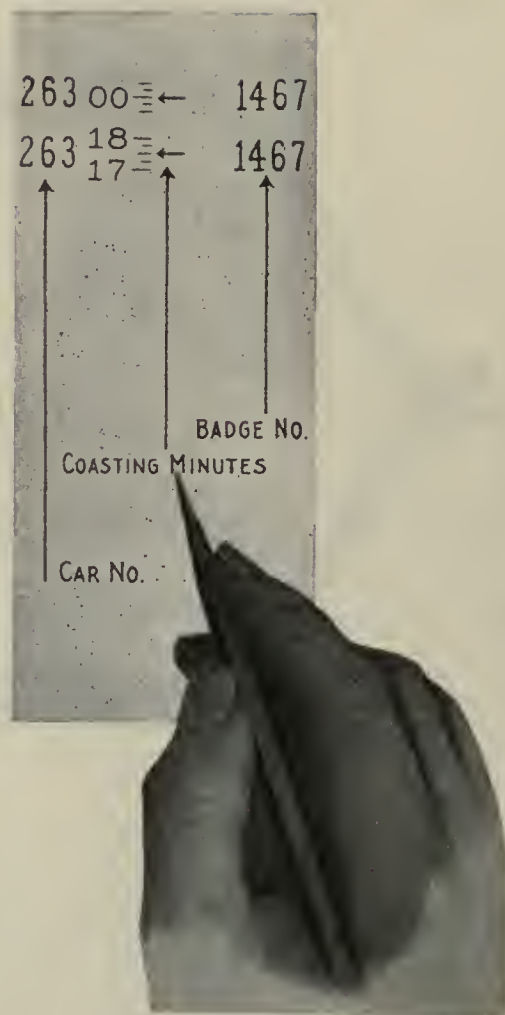
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Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

Volume 52

New York, Saturday, July 20, 1918

Number 3

Straight Runs Plus Trippers May Be Better Than Swings

THOSE who have read Ibsen's "Lady of the Sea" may recall that so long as the lady had no choice but to stay with her husband she was very unhappy; yet when he gave her absolute freedom to choose any corner of the "triangle" she found she loved him best.

A parallel psychological problem appears to have been solved on a number of Southern and Southwestern properties by changing from swing to straight runs plus voluntary trippers. So long as the men were ordered to work on swings, many had a grievance against long hours. No sooner were they told that nine to nine and one-half hour straight runs would be substituted with the choice of working trippers entirely up to them than they asked for the extra hours almost unanimously. In short, while the men want to work the extra hours because they need the money, they feel a lot better because whether they do or don't is entirely their decision. If the practical results are so advantageous to the railways under unheard-of labor shortage conditions, why shouldn't others take this up with their men? Vexatious problems sometimes have a happy way of settling themselves if we only leave the rut of traditional practices.

When Run-Down Accidents Increase

THE value of high-rate acceleration with modern equipment is so great that it would be a pity to forego it through an assumption that too many run-downs will be the inevitable consequence. It must not be forgotten that it takes a motorman some time to adjust himself to the difference in accelerating at say 1 and 2 or even $2\frac{1}{2}$ m.p.h.p.s. The old rate has become an acquired instinct with him and until he has replaced it by a new set of instincts, he is likely to have more accidents. This is especially so where the mistake is made of permitting the same man to work on low-accelerating and high-accelerating equipment.

Nobody would deny that the air brake is a safety device of the first order. For all that, we recall a case where in the first year with air the men had more accidents than with hand brakes, in the second year they equaled the hand brake average, in the third and following years they went below the hand brake. In other words, more than a year was required to inculcate the difference between air and hand braking. Therefore we believe that as motormen become accustomed to faster acceleration they will be just as able to avoid accident as with slower equipment. This will certainly be so on cars of light construction where a smash-up means more to the physical welfare of the motorman than it does back of a "battleship" style of car.

Mr. Mortimer Advocates the Zone System and Discusses Public Ownership

EVERY reader, we believe, will be interested in the interview in this issue with James D. Mortimer, president North American Company, on the present situation. Mr. Mortimer has just returned from a visit to the Pacific Coast so that his views may be considered to be based upon conditions in the Far West as well as in the Central States and the East. Frankly, he is not optimistic. Regulation, he says, has broken down. Railway credit has largely gone. The construction of extensions has ceased. Labor thinks more of the sanctity of the union than of the solvency of the employer. Traffic has fallen off in those properties where a 6-cent fare has been permitted, so that they are but little better off in a financial way now than formerly. On the other hand, an 8 or a 10-cent fare would probably drive off very much more traffic and encourage jitney competition so that the net gain from such a fare increase would be slight or would disappear.

Mr. Mortimer, however, does not stop with his diagnosis of the disease. He tells what may be done, in his opinion, to relieve the patient. The case is desperate but not entirely hopeless. It is this portion of the interview in which we believe our readers will be particularly interested. Fundamentally Mr. Mortimer's remedy is to encourage short-haul and non-rush hour travel as these are the most profitable parts of a railway company's business. This means the zone system with possibly lower fares between the rush-hour peaks. The logic of Mr. Mortimer's argument on this point seems reasonable.

Finally, Mr. Mortimer disposes of the bogey of municipal ownership, at least so far as the electric railway companies are concerned. If the public insists upon taking over the properties, it can have them, though preferably they should be taken over by the State rather than the municipality. Only let the requirements of sound finance and accounting be followed. The companies will have to receive fair compensation, as the courts will protect their equities in the properties. This may prove the best way out of the difficulty in many cases. The security holders would at least get back their investment, and if the State could not make a profit out of the lines it could look upon its loss from operation as a subsidy to provide cheap public transportation. From the point of view of the taxpayer or from that of ultimate economy and efficiency in city transportation this plan may not be a desirable one, but the State is certainly in a more logical position to defray a subsidy than a private company. At all events, these comments of Mr. Mortimer will stimulate thought and, we hope, will also hasten progress toward a more rational treatment of railway properties and a profitable rate of fare.

Big Things Cannot Be Done in a Little Way

THE decision of the Board of Public Utility Commissioners of New Jersey granting the Public Service Railway a revenue increase of \$860,000, instead of the desired \$3,700,000, is a matter of national importance. This company is one of the three largest systems in the country, its operations covering the entire State. Denial of more nearly adequate relief to a company of such importance will not pass unnoticed, and it is a distinct misfortune to the entire industry.

The decision of the New Jersey commission followed a protracted series of hearings extending over three months. The case of the company was presented in thorough and comprehensive fashion, while the testimony submitted by the municipalities was puerile and was destroyed upon cross-examination. Judged merely from the standpoint of the record, the need of the company for material relief was undeniable. In view of these circumstances, what reason did the commission give for bestowing such niggardly relief?

The answer lies in the commission's notion as to what constitutes proper emergency relief during the period of abnormal conditions caused by the war. Listen to its enunciation: "An emergency for which a carrier is entitled to relief by a temporary emergency rate exists where, by reason of general conditions not affecting the applicant utility alone, the operating revenues are insufficient to operate and maintain its property and to pay rentals and interest on such of its securities a default in the payment of which would jeopardize the solvency of the company."

Acting upon this theory, the commission reduced the measure of relief so as to require the Public Service Railway to pass its dividends. Thus the plain inference of the decision is that a sufficient amount to pay a fair return upon the investment (providing that return is not greater than was paid prior to the beginning of the emergency) will only be allowed when a valuation constitutes a part of the rate proceeding. But why should the commission's belief that the ascertainment of the value of utility property "requires exhaustive investigation and is inconsistent with the granting of emergency relief required by general conditions" give it license to disregard the evidence presented that the property is worth much more than \$100,000,000, exclusive of franchise values? The value mentioned was obtained by a very careful appraisal made by Dean Cooley, the money expended on the property since that appraisal was made and other fair adjustments. As Mr. McCarter showed, the desired revenue increase would not give the company a fair return of 8 per cent on more than \$81,000,000—certainly less, he said, than the value of the property.

One particularly amazing part of the decision is the assertion that the company will not have to invest additional capital during the period of the war. Every well-managed company in the country, in replacing track, substitutes a structure of greater cost, in which the investment of additional capital is consequently required. The absurdity of the commission's opinion is clear when the evidence concerning the hundreds of war industries in New Jersey is considered. The testimony showed that almost 200,000 workers in such establishments are handled daily. The government is helping to

finance some new construction, but this tells only a small part of the story. No company in the country has been required or will be required to make larger investments as a means of assisting in the successful prosecution of the war.

It is noteworthy that some of the newspapers in New Jersey have not been slow to point out the political complexion of the decision. The Governor of New Jersey is a candidate for United States Senator. He has recently appointed two of the present members of the commission. The leading spirit in the opposition was George L. Record, who also aspires to the Senatorship. The Public Service Railway has apparently become a football in a sordid struggle for political preferment. Each side has endeavored to make capital out of the company's necessities. The action of the New Jersey commission is one of the strongest arguments for the assumption of absolute control over utility rates by the federal government. If the state bodies fail they must be ruthlessly swept aside, for such companies as the Public Service Railway are just as much a part of the nation's machinery for making war as are the shipyards which it serves.

The Remote-Control or Push-Button Car

A WRITER in a recent issue of the *Scientific American* allows his mind to wander fancy free on the automobile of the future. He notes how one manual operation after another has been eliminated, such as hand cranking and hand pumping, and ventures to prophesy that some day all of the functions of starting, stopping, steering, lighting, etc., will be performed through the medium of a push-button board.

As we read the article, there arose before our eyes a companion vision. We no longer saw an electric car platform cluttered with a controller, brakes, door and step levers, sander rods, gong pedals, circuit-breaker handles and all the other impedimenta that are accepted necessities of the present-day car. What we saw in their place was a neat little benchboard on which were buttons or keys with names indicating the several devices, and an attractive young lady seated in a comfortable chair playing on these keys as on an organ!

Shall this vision remain a dream when men conceive such possibilities for a vehicle which must carry its own power plant? Is it not far easier to do these things on a railway car which is untroubled by a power plant and which may draw at will directly upon stores of power already converted to electricity? Is it possible that manual cranking and manual pumping of automobiles are being superseded because the automobile is so often driven by the owner himself, and automobile makers outvie one another to cut out the curse of work? Would the automobile have advanced so rapidly in the direction of abolishing hand labor if it had been made for operation by chauffeurs only?

These are pertinent, some may say impertinent, questions, but they direct a finger at a point long overlooked in electric railroading. This point is that power-operated or indirect-control devices are something more than means of making life easier for the operators. Basically, they are intended to increase the mileage out-

put of the car through saving seconds or fractions of seconds.

Some years ago we forecast the combination of power, braking, sanding and door control devices in one mechanism—and it has come to pass. The push-button control of air-operated doors has also arrived. So we feel no undue degree of rashness in prophesying the day when the perfection of remote control so peculiar to electricity will give us a car operated by a "cashier-motress" and a platform cleared of everything that can hamper the interchange of passengers.

Boiler Firing as an Art, With Firemen as Artisans

WITHIN the memory of most men having considerable experience in power production the boiler fireman's province enjoyed the status of a trade. The fireman was an artisan. "Once a fireman always a fireman" was true in a very great number of instances. The avenues of advancement were less numerous, means of education were much less common, correspondence schools were barely in existence and the technical press was less developed. Aggregations of power production apparatus as we have them to-day in great power plants were non-existent.

The fireman nearly everywhere was an individual, not a mere unit in a group. His social condition was nearly stationary. Many a man of unlettered though strong intelligence swung the shovel and had swung it steadily for years. He had learned to swing it through a sort of apprenticeship to some other older man who had swung it for years himself.

The fireman's skill was comparable certainly to that of a gardener with his tools. Firing was an art and the fireman an artisan. There was distinctly good form in firing. To possess it was to be a fireman and to earn what were, for that time, fair wages. To-day certainly in great power plants the fireman is a laborer. The measure of his work is a quantity unit—tons of coal per hour per boiler, perhaps—not a quality unit. Even with the ever-growing use of automatic stokers the converted fireman hardly emerges from the laborer's status. He has not one or two stoker fires to tend but a whole group or row of them. He earns high wages and works only eight hours, but he comes and goes for all that. Has he the art of firing? He is quite innocent of it. If he had science he would need no art. There are instruments for this and instruments for that—air gages, draft gages, temperature gages, steam-flow gages, even CO₂ gages. But he passes them up.

And the boiler efficiency—is it to be passed up too? Not in these days of efficiency urge. Surely not when the country looks so directly to the power plants to take a large part and a leading part in the coal conservation so greatly needed. Let the chief engineer take the burden then. Let him with patience and knowledge and skill and faith and enthusiasm get out among the laborer firemen and the laborer stoker operators. We cannot sigh for a day that is gone. The day of the mammoth boiler with the engineer to run it has barely yet come among us. Let formal firing rules be eschewed. But let there be personal contact and personal guidance.

Take up the white man's burden,
Ye dare not let it fall.

Power System Inter-Connection As a War-Time Necessity

BROAD-VISIONED engineers and utility managers have been advocating power plant inter-connection for years. To them a power line is just as much of a transportation unit as a railroad, and, as railway inter-connections "proved in" their value long years ago, they have felt optimistic about the possibilities in the energy-carrying field. That state regulatory bodies are beginning to see the light is clearly indicated by the action of the California Commission a couple of years ago in its recommendation of State-wide power system inter-connection.

But why is the problem of such pertinent interest to-day? The answer is that our visible supply of coal for the current year, according to the latest reports of the Fuel Administration, is short some 50,000,000 tons of what it ought to be and that at all costs war supplies must go forward to the fighting front. The economic ideal of a few years ago has become the stern military necessity of the present moment. That the problem is of more than academic interest is evidenced by the recommendation recently made to the federal authorities by government engineers relative to the power systems in several of our important industrial districts. And in these days action follows recommendation with sometimes a disconcerting promptness.

It is beside the point here to discuss at large the advantages of inter-connection. Suffice it to say that in most cases they are great both from the standpoint of fuel saving and from that of continuity of service. The real questions which military necessity is forcing on the industry are those dealing with how to do it and not whether it is worth doing. Thus the problems of labor, material and the technical matters involved in construction and operation are the all-important ones.

The technical problems are rather numerous and on the whole are of interest to the electric railway industry since in inter-connected districts they will receive their energy supply from the common source. Increased generating capacity back of a line increases the duty required of circuit-breaking switches and other overload protective devices and magnifies the destructive effects of short-circuit. Increasing the mileage of connected transmission lines increases their ability to store energy and therefore the violence of line surges. Line troubles are spread out over a wide district by conduction. Connecting lines or cables may be of insufficient current carrying capacity to carry the necessary synchronizing currents. The difficulties of fault location are increased.

We see therefore that inter-connection of lines brings in new problems, both of construction and of operation. Old lines may have to be reinforced both in insulation and current carrying capacity. New circuit-breaking switches may be necessary as well as special provisions for localizing and isolating trouble. Short gaps between existing lines may be required. For new construction made at the demand of the government federal funds will no doubt be available, but the problems of construction and operation will be squarely up to the utilities. Their prompt solution will depend largely on the utilities' knowledge of operating conditions on their lines and upon preparedness in the way of tentative plans of action.

Providing Strength and Attractiveness in Special Overhead Supports

By Charles R. Harte

Construction Engineer The Connecticut Company,
New Haven, Conn.

Overhead Bridges and Other Special Structures Furnish an Opportunity for Ingenuity and Application of Correct Design Principles

THE first electric roads differed from their predecessors the horse railways only in the method of moving the cars, and the service was readily cared for by simple and light overhead construction. As the art advanced, however, and it became necessary to collect heavier and heavier currents at ever-increasing speeds, the overhead had to be correspondingly developed.

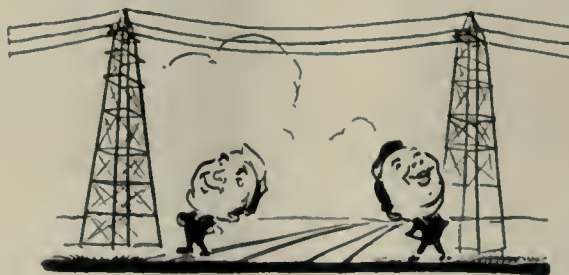
The pulls in the direction of the line practically balance at each point of support, or if they do not, because of unequal lengths of adjacent spans, the excess can be cared for by guys ahead or back which do not require any additional space outside the poles. But the tendency to pull the support over toward the track when, as is the case with heavy overhead, the pull is greater than the pole itself alone can resist, is not so easily provided for. To avoid the expense and trouble of special concrete foundations or side guys with their re-

quirement of much additional right-of-way there was developed the bridge support, consisting of a pair of poles or frames, one on each side of the track, with a connecting truss serving the double purpose of providing a carrier for the overhead itself and a strut to balance the inward pulls on the two frames.

A Bridge Structure with Wood Posts

As in the case of transmission-line towers there has been quite a range of design, from forms so light as to require temporary bracing until the messengers are attached (after which they act as guys), to those which, like the early Westinghouse, are substantially each one an anchor bridge. Abroad, the Siemens-Schuckert electrifications employed A-frames, of channels back to back with diagonal and horizontal lacing of angles, with a pair of channels back to back for the cross strut between. The legs were evidently set in concrete or masonry in most cases, as the only protection against cross swaying of the structure is by a tie rod from the top of each frame to about the quarter point of the strut. The German General Electric Company employed a very similar form. In England, the Midland used two types, one involving a wood pole at each end of paired channels, the other, used at terminals, of structural steel throughout. Both forms have very interesting details. The wood posts, some of which are round while others are square, have notched into them a pair of clamping col-

lars which are close to the top and about 2 ft. apart. The bottom collar has flanges which take between them a gusset plate extending up between the two channels of the strut, while the flanges of the upper collar go outside the webs of the channels, and are fastened to them by rivets extending through flanges, webs and gusset plate. Attachments to the strut are held in place by bolts passing between the channels, which are maintained a uniform distance apart by spacers between. While this treatment, by making it unnecessary to drill holes in the flanges for attachments, preserves the full strength of the section, the narrow space between the channels tends to hold moisture and cause corrosion, and is very difficult to paint or otherwise protect. The steel bridges consist of square posts with angle-iron corners and inside lacing. These carry a built-up truss with straight top chord, diagonal bracing and a lower chord, parallel to the top chord for most of its length but curved down at the ends to meet the post, thus both forming a bracket and relieving



That was a tough problem in tower design, but we solved it, all right!

the severity of the design. As with the wood-pole form the truss, which is of angles, is double, but in this the angles are much farther apart, and are tied together by diagonal lacing bars on top of the top member and on the bottom of the bottom member.

In this country a design somewhat like the Siemens-Schuckert was early developed by the Archbold-Brady Company. This company's bridges have triangular posts with channels for legs, but the bracing consists of horizontal angles and diagonal tie rods. The ends of the angles are "bulldozed" flat and bent at right angles for riveting to the channel backs, while the diagonals take hold of bolts going through the flattened position of the angle close to the bend. The chief difference is in the strut, which consists of two channels back to back and some 3 ft. apart, braced by vertical angles and diagonal ties, the ends of the lower channel bending up at the last angle and meeting the ends of the top channel at the post, while a pair of angle braces from the bend down at an angle of 45 deg. to the legs of the main post give the desired stiffness and permit a comparatively light connection to the foundation.

The Westinghouse bridges, developed at about the same time as the Midland form, have similar square posts with angle corners, but the lacing is outside, and the truss has parallel top and bottom chords. Incidentally, the connections are much stronger, for where the Midland diagonals are riveted to the flange of the chord angle the Westinghouse form has connection plates.

In an endeavor to secure a design which should be more economical and less severe in appearance the New York, New Haven & Hartford Railroad, on an experimental extension toward New Haven, employed an entirely different type, made up of two posts square in section with diagonal lacing, tapering from butt to end, each having a vertical lower portion with the top bent to a quarter circle. Between the ends was fitted a strut of pipe braced by tie rods passing over a central spider and bolting through end plates. This was of very pleasing appearance, but fabrication proved difficult and costly, the curved sections insisting upon twisting when riveted, and when the work was extended to New Haven the railroad employed a still different form, combining the good points of both the earlier types.

In this the posts are vertical, square in section and double laced, but the taper is from a comparatively

makes the scheme more satisfactory, center poles with brackets have been used with some success. In this country, however, the clearance requirements of our large equipment would force the use of such long brackets that the necessary bracing and extra strength on the part of the support plus such shifting of tracks as is necessary to give required clearance between them, would usually much more than balance the saving over a bridge with its two posts. In some places, however, notably at stations and similar points where conditions seriously restrict the possibilities of support location, the center pole with double brackets is much the best treatment.

Where the track is put down in connection with the electrical system, provision for bridges or for guyed poles can often be made in spite of apparently very serious obstacles. But when the track has been installed without regard to electrification the later erection of

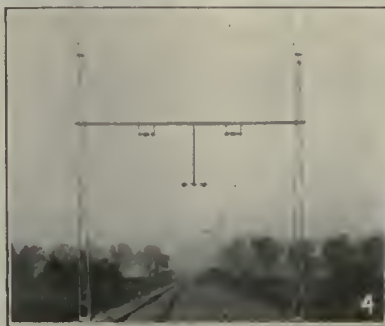


Fig. 1—Overhead construction on Midland Railway electrification. Wood-pole and channel-iron strut in foreground; structural steel bridge in background.

Fig. 2—Overhead construction on Midland electrification; wood poles with double channel-iron truss.

Fig. 3—Experimental crane type of overhead bridge on New Haven electrification.

Fig. 4—Light bridge type of overhead construction used by General Electric Company of Germany.

Fig. 5—Bridge type of support on Pennsylvania electrification.

OVERHEAD BRIDGE SUPPORTS ARRANGED TO BALANCE INWARD PULLS ON TWO FRAMES

small section at the bottom to a considerably larger one at the truss, and then in an extension carrying the crossarms, to a small top. The truss has parallel chords and single diagonals, but the "curse" of the square corners at the connection to the post is removed by a curved bracket which, with the tapered post, gives a decided arch effect. This effect is very pleasing and at the same time, as in the Archbold-Brady type, the resulting stiffness relieves the footings of the duty of meeting heavy bending stresses.

The present day tendency, however, seems to be away from these heavy rigid structures, for the most recent three electrifications, the Norfolk & Western, the Pennsylvania and the New York Connecting Railroad, wherever conditions permit, employ tubular poles heavily side guyed with cross catenary spans between, while where side guys are not practicable the same type of pole is employed with a very light truss.

Particularly abroad, where the smaller equipment

wires may prove a good deal of a problem. In the case of the New Haven Railroad at Bridgeport, Conn., the tracks are largely on an earth fill between stone retaining walls, the faces of which form the side lines of parallel streets. The narrowness of the viaduct at certain points brings the side of a car on the outside track practically at the street line. Where the viaduct is high enough the trouble has been met by building a reinforced-concrete bracket out from the wall and carrying the bridge footing on it. But there were close points where the viaduct was so low that such a bracket would project into the street clearance. Here "broken-backed" or more properly speaking, broken-legged, towers were used, the lower portion bending in to follow the car clearance line, bringing the foot on the wall. Of course, in such a case the connection at the angle and the inclined portion must be very carefully studied and designed safely to resist the bending stresses which occur. The New York Connecting Railroad has a somewhat

similar viaduct, but while this has compelled the use of some bridges the foreknowledge of the electrification enabled suitable provision to be made at the start.

Guyed-Pole, Cross-Catenary Span Construction Is Promising

The question of the contact system and its method of support, particularly if it is overhead, is of much importance in steam road electrification, and while there has been much progress there is still room for improvement. The unpleasant results which might be anticipated if light supports should let down the overhead very naturally deter any extensive ventures in the direction of lightness, and indeed compel very conservative work in all directions. At the same time a little longer service with guyed-pole and cross-catenary span should give information which will to a considerable degree establish reasonable limits for design.

The design of anchor and switching bridges involves nothing new, and as the pulls and loads which they must meet can be determined quite accurately for each case, the only complications are those resulting from cramped location. Frequently the anchoring and switching functions are combined, in which case it is essential so to separate or protect the two junctions that a breakdown of one will not involve the other nor prevent access to the unaffected portions. Provision must be made so that mechanical failure of any of the anchor points will not wreck the switches mechanically nor afford opportunity for an arc to or over them. Further, the misbehavior of one of the switches must not flood the bridge, nor for that matter the tracks below, with hot or blazing oil nor can it be permitted to let loose on the structure currents which may burn it, to create such potential gradients on it as seriously to shock an attendant, to burn off the anchored messengers or to bridge over their insulation.

Switches or Bridges Require Safeguarding to Reduce Hazard

The first requirement can usually be provided by having the anchor attachments on the outside of the structure while the switching apparatus goes between the girders. Suitable drains with collecting shields (and it must not be forgotten that an oil switch in eruption throws out the oil rather vigorously) will prevent damage from oil. Thorough bonding and grounding of the structure and provision of passageways and operating spaces of such width that the operator does not come in contact with more than one point at a time, will take care of the electrical hazard. As a matter of fact, all such apparatus-carrying structures should be considered and treated as stations, both in design and in operation. As between construction and operation, provided the construction has been right, which will insure absolute safety, on one hand, and that which is a long ways from so doing, on the other, there is astonishingly little difference in actual cost in the majority of cases. A minor accident will cost several times as much as the extra cost of construction, while the knowledge on the part of the operators that they are protected will result in work of a quality sufficiently higher to make the extra investment worth while.

The early transmission lines, serving only as direct connections between primary and substations or switching stations, with all apparatus housed, had little occa-

sion for special structures other than those serving to get around some right-of-way complication or to carry the line in a long span across some obstacle preventing the normal type of construction.

Of the first, an interesting example is the Swiss line along the shore of Lake Lucerne where, with the highway occupying all of the shelf at the edge of the water, the towers are carried on steel beams "cantilevered" out from the retaining wall for the road. Where footings can be had on each side of a road a passageway or bridge may serve. Because of the powerful twisting moment in case of any unbalancing of the pulls by the spans, it is undesirable to have an arrangement not symmetrical with the pole. In one case where the line ran along a road with a heavy cliff at one side, it was proposed to use poles with outriggered arms having struts against the rock. This was never built, however, which was undoubtedly fortunate. Because of its location it was certain to catch anything which came down the cliff, and the expenditure of a little more than double the estimated cost on a line which was longer but in location far better in every way was very much the more economical treatment. Where location on the face of a cliff is unavoidable it may be possible to cut towers down to small and simple frames, but in such cases it must not be forgotten that there reasonable access to these frames must be provided for use in case of trouble.

A Very Unusual Case at Niagara Falls

An interesting example of special structure is furnished by the cantilevers of the Niagara, Lockport & Ontario Power Company line at the Niagara River gorge. The span at the top of the cliffs was considered too long for so important a line, and it was decided to cross at the bottom of the gorge. The pitch of the face of the gorge is so steep that with towers at the very edge of the top the conductors would not clear. Accordingly cantilevers were extended well beyond the edge. The conductors span from a tower near the edge to the cantilevers; thence down to the towers at the foot; and thence across. The heavy angle at the bottom towers is up and away from the insulators, the attachment of the conductors being by special clamp. At the top, however, the angle would bring the conductors so close to the petticoats of the insulators that the latter would largely be useless. To obviate this difficulty each cantilever carries two sets of insulators. Special heads carry supports parallel to the line but a short distance each side of it. These in turn carry a steel bar at right angles to the line to which the conductor is tied, and from which it drops to the tower below.

To-day such conditions are largely met by the use of suspension type insulators, which are able to handle almost any kind of complication arising from angles, whether vertical or horizontal, and that very largely on standard towers. Indeed the suspension-type insulator has very much simplified the problem of the long span, and where in the earlier days of transmission quite special structures were required for the necessarily complicated combinations of pin-type insulators and clamping devices, to-day the crossing towers as a rule have only to furnish suitable attachments for the strings of strain insulators, and sufficient strength on the part of the tower safely to meet this pull. There is,

however, one case in which a special tower is still used, and that is where a long span is carried by towers one or both of which must be very high and it is important to reduce the pulls to a minimum because of the fast increasing cost of each additional pound of resistance required.

A scheme which has been used with success in several instances is to counterweight the pull of the span, either directly or through some multiplying device such as is often employed for elevators, the travel of the clamp on the span being as many times the travel of the

also been proposed, although, so far as the writer knows, this has never been done, to mount one tower on trunnions and allow it to tilt and so adjust the sag to the load, a suitable counterweight maintaining the desired stress.

There is one more form of special structure—the development of a spirit of reason and fairness in the matter of high-tension crossing protection having taken its supports out of the special class—which is steadily gaining in importance, and that is the outdoor switching station. This, however, is special as a development



Fig. 6—Center-pole overhead supports, Pennsylvania Railroad electrification.

Fig. 7—Bridge posts bracketed out from viaduct wall on New Haven electrification at Bridgeport, Conn.

Fig. 8—Bracket type of pole in pinched location, Connecticut River Power Company.

Fig. 9—Westinghouse bridge on New Haven electrification.

Fig. 10—Combined bridge and bracket overhead support on Pennsylvania electrification.

Fig. 11—Light type of overhead bridge on line of Syracuse, Lake Shore & Northern Railway.

Fig. 12—McHenry-Murray bridge on New Haven electrification. (Note the pleasing effect of the tapered posts and the curved brackets.)

CENTER POLE OVERHEAD CONSTRUCTION AND COMBINED BRIDGE AND BRACKET SUPPORTS

counterweight as there are parts of rope between the sheaves. The counterweight itself must, of course, be inversely as heavy as its travel is multiplied. The operating cable is flexible steel hoisting cable attached to the conductor by suitable strain insulators and clamps; the conductor is carried over or through the tower and must have provision for taking care of the slack when the counterweight is down. In one case, where the span wire changes 2 ft. for every foot of counterweight travel, the span is connected with the line wire beyond by a jumper which, going over a sheave on insulators to a pin-type insulator, carries in the space between a small weight with a sheave through which it runs. As the span is shortened or lengthened this weight keeps the jumper taut, ample clearance from the structure preventing any contact. This treatment involves very little special treatment of the tower itself. It has

rather than as a structure, for after all it is merely the skeleton of what up to recently has been the high-tension switching room of the power or substation. Starting as a group of plain knifeblade switches on a standard tower, for emergency sectionalizing, the outdoor switching station has developed until to-day these installations frequently consist of elaborate busbar systems with every switching and protective refinement capable of effecting under load all sorts of transposition of service.

In short, the full facilities of the station to this end are moved out of doors, as when inside the station it is essential that there be ample clearances and facilities for safe and comfortable operation. Outside of this, and the circuit arrangements which are apt to be special for each case, the problem is one for the structural engineer rather than the overhead man.

Effect of Grades and Curves in Plotting Speed-Time Graphs

By C. W. Squier
Electrical Engineer

The Author Describes How Grades and Curves Are Taken Into Consideration in Plotting a Continuous Speed-Time Graph

AT THE BEGINNING of this discussion on the preliminary calculation necessary in choosing car equipment I called attention to the fact that it is usual to assume a typical run for studying the various characteristics of the equipment. Different typical runs representing the service under consideration have been worked out and the procedure necessary for calculating and plotting the various graphs has been described. All this, however, has been done for a level tangent track. There are times when a proper study will necessitate taking into consideration the individual runs as they are actually made with due regard to the curves and grades encountered. Such studies of operation are absolutely necessary when determining the maximum capacity of a certain section of track, that is, the greatest number of cars or trains that can be operated through a given section per hour or during any given time interval.

Also in laying out signals it is necessary to know the speed at various points and this, of course, will be affected by the grades and curves of the line. Problems of this nature are continually occurring in the work of the operating engineer and while it is not usual to go into this great detail in choosing the car equipment, still a knowledge of the factors involved is essential.

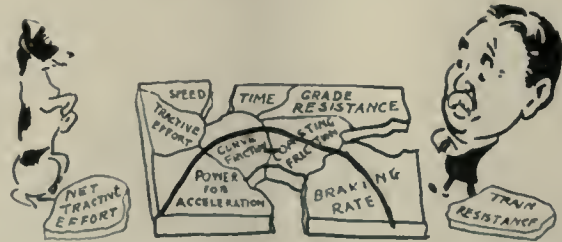
I shall describe briefly the calculations and methods most generally used in determining speed-time, distance-time and speed-distance curves when all variations of grade and curves are taken into consideration. As the graphs for current and power input are derived curves the methods already described for obtaining these will apply here also.

To illustrate this I have chosen an express run from Union Square to Canal Street in the new Broadway subway in New York City, with train make up and equipment as shown in Table I.

The speed in miles per hour on curves is limited to the square root of the radius of the curve in feet, and

this speed is not exceeded until the last car of the train is off the curve. This is the usual assumption for the safe maximum speed while rounding curves and is limited by the elevation of the outside rail. Easements are considered as having a radius of twice that of the curve having the easement. A speed of 15 m.p.h. must not be exceeded by the train while taking crossovers, as superelevation cannot be provided at these points.

The motors used are arranged for tapped-field control, and the change from full field to permanent field is made when the current drops to 200 amp. This takes place at a speed of 16.7 m.p.h. The current swing is from 200 amp. to 337 amp. and the tractive effort from 2870 lb. to 4750 lb. The run is made at the highest possible schedule speed. The amount of coasting and braking is limited to that necessary for slowing down the train whenever short-radius curves, steep down grades or crossovers make this necessary. In order to conform to actual operating conditions four seconds are allowed from the time the motorman drops off power and starts to apply



All necessary considerations fit together to make a speed-time curve, but it's some puzzle at that

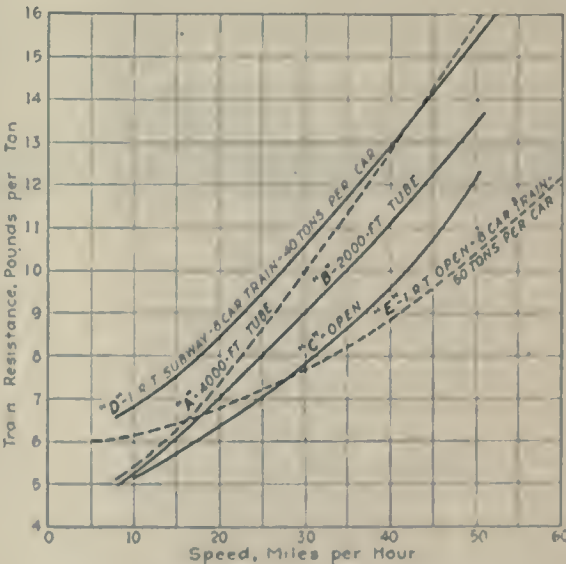


FIG. 1—GRAPHS OF TRAIN RESISTANCE
A, B and C, from Tests on the Hudson & Manhattan Railroad.
D and E, from Tests in the Interborough Rapid Transit Subway.

TABLE I—OPERATING CONDITIONS FOR PLOTTING SPEED-TIME GRAPH	
Number of cars in train	8
Total length of train	536 ft.
Weight of car as equipped	89,000 lb.
Weight of passenger load per car (200 passengers at 140 lb. each)	28,000 lb.
Total weight of car with load	117,000 lb.
Motor equipment, G-E 246-A motors per car	2
Gear ratio	61:22
Diameter of wheels	32 in.
Train resistance from tests in service (See Fig. 1, Curve D)	
Curve resistance per degree of curvature	0.8 lb. per ton
Average line volts	550
Average accelerating current per motor	290 amp.
Average braking rate	2 m.p.h.p.s.

the brakes to the instant that the braking rate of 2 m.p.h.p.s. begins.
Fig. 2 shows the completed speed-time, distance-time, speed-distance and power-input graphs for this run. The profile and alignment for the track are included for convenience in determining the points at which the

TABLE II—VALUES OF DIFFERENT QUANTITIES FOR EACH STEP OF SPEED-TIME CURVE CONSTRUCTION

Speed, m.p.h.	Amperes	Tractive Effort, Pounds	Grade, per Cent	Grade Resist- ance, Pounds	Per Motor		Curve Resist- ance, Pounds	Train Resist- ance, Pounds	Total Resist- ance, Pounds	Net Tractive Effort, Pounds	Rate of Acceler- ation or Retard- ation, m.p.h.p.s.	Distance from Start, Feet
					Curve, Degrees	Curve Radius, Feet						
6.4	290	4,800	Level	...	Straight	Straight	...	...	...	4,582	1.57	...
14.2	290	4,800	Level	...	Straight	Straight	...	218	218	2,642	0.91	...
16.7	200	2,870	Level	...	Straight	Straight	...	228	228	4,522	1.55	...
16.7	337	4,750	Level	...	Straight	Straight	...	236	236	3,664	1.25	...
18.0	295	3,900	Level	...	Straight	Straight	...	242	242	3,128	1.07	...
19.0	267	3,370	Level	...	Straight	Straight	...	248	248	2,652	0.91	...
20.0	243	2,900	Level	...	Straight	Straight	...	254	254	2,346	0.80	250
21.0	225	2,600	Level	...	Straight	Straight	...	261	477	1,823	0.62	...
22.0	209	2,300	+0.37	216	Straight	Straight	...	267	483	1,587	0.54	...
23.0	195	2,070	+0.37	216	Straight	Straight	...	273	489	1,361	0.46	...
24.0	182	1,850	+0.37	216	Straight	Straight	...	280	496	1,204	0.41	...
25.0	172	1,700	+0.37	216	Straight	Straight	...	286	502	1,048	0.36	...
26.0	163	1,550	+0.37	216	Straight	Straight	...	292	508	902	0.31	...
27.0	155	1,410	+0.37	216	Straight	Straight	...	296	512	828	0.28	...
27.5	150	1,340	+0.37	216	Straight	Straight	...	294	510	...	-0.18	930
27.25	Coasting	...	-1	-585	Straight	Straight	...	...	294	291	0.10	...
22.25	Coasting	...	-1	-585	Straight	Straight	...	...	Braking	...	-2.00	...
22.25	Braking	...	-1	-585	Straight	Straight	...	...	Braking	...	...	1,230
22.25	Braking	...	-1	-585	Straight	Straight	...	279	262	44	...	1,550

speed is limited and to assist in calculating the combined train resistance.

How the Degree of a Curve Is Determined

The values of railway curves are commonly expressed in terms of the central angle subtended by a chord 100 ft. long. Thus a 1-deg. curve is one such that the angle at the center end of the radius is 1 deg. and the radius is $100 \times 360 \div 2\pi = 5730$ ft. The radius in feet for any curve is therefore to $5730 \div$ degrees of curvature.

A convenient form for tabulating the various values is shown in Table II, which gives the figures obtained for the first part of the run. The speed-time graph is plotted by using these values as described in my previous articles. The graphical method of W. S. Valentine referred to in the article of May 18 is a great convenience in a case such as this, and in Fig. 3 is shown this method as applied to the problem we are considering. From these graphs the acceleration at any speed on any grade may be read direct.

At the beginning of the run the track is straight and level for 250 ft. and the train accelerates at a rate of 1.57 m.p.h.p.s. to a speed of 14.2 m.p.h. when all resistance is cut out. The point A, Fig. 3, shows this speed and K the corresponding acceleration. From this point, A the speed is increased to 16.7 m.p.h., point B,

using the full field of the motors and the rate of acceleration decreases from K to L. The change to the permanent field is then made and the acceleration rate increases to 1.55 m.p.h.p.s. as shown at M.

The speed now increases from C to D and the acceleration rate decreased from M to N. At this point the train reaches the 0.37 per cent grade and the rate of

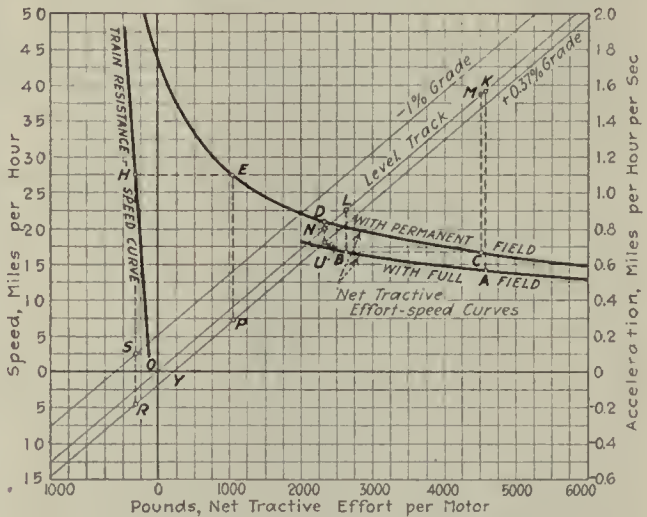


FIG. 3—GRAPHS FOR PLOTTING SPEED-TIME CURVES WITH VARIOUS GRADES AND CURVES

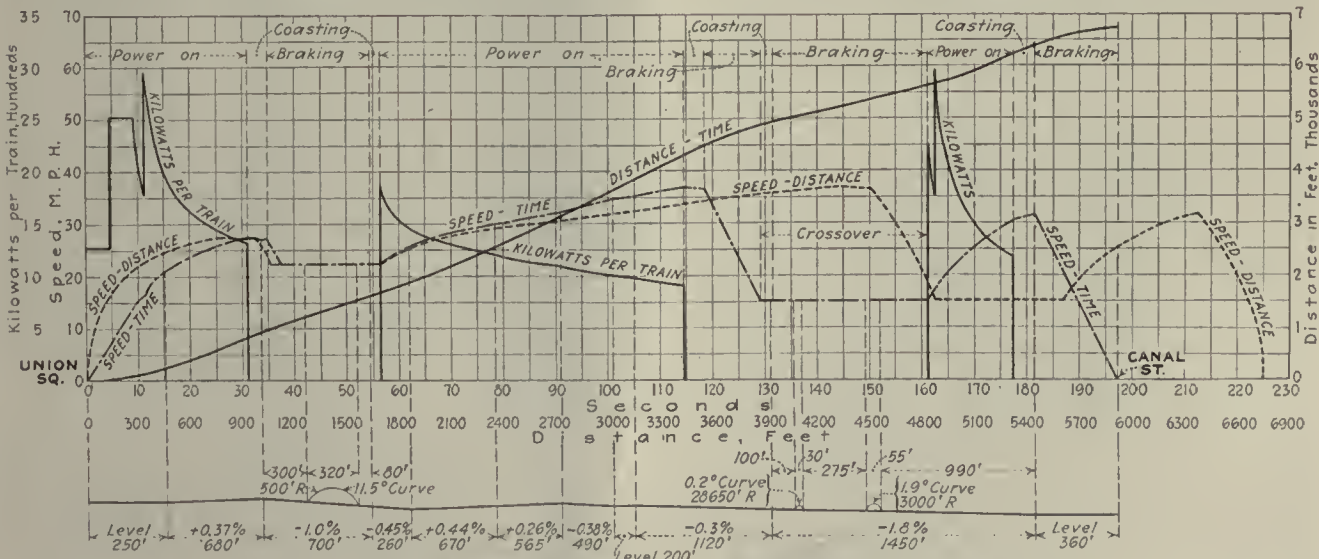


FIG. 2—SPEED-TIME, RESISTANCE-TIME AND SPEED-DISTANCE GRAPHS

acceleration is then indicated by the line *RYPU* which is obtained as follows: When a train is operating on a grade, it is equivalent to having the net tractive effort decreased by the amount of the grade resistance. The amount of the grade resistance per motor in this case is $(117,000 \text{ lb.} \times 0.0037) \div 2$ or 216.5 lb. This value is laid off to the right of the point *O* as shown by *OY*. A straight line drawn through *Y* parallel to *ONLMK* will be the required acceleration graph on this grade. The train continues to increase in speed to the point *E* 27.5 m.p.h. on the speed-net tractive-effort curve, and the rate of acceleration decreases from the point *U* to the point *P*.

Slowdowns Must Be Made for Short-Radius Curves

As the train is now approaching a 500-ft.-radius curve, the speed must be decreased to $\sqrt{500}$ or 22.3 m.p.h. Power is accordingly shut off and the train coasts for four seconds before the brakes are effective. The rate of retardation while coasting is found by projecting the point *H* corresponding to 27.5 m.p.h. on the train resistance-speed graph to the point *R* on the acceleration graph. This rate of retardation is found to be 0.18 m.p.h.p.s. After four seconds the brakes are applied and the speed of the train decreases to 22.3 m.p.h. When the train reaches the 1 per cent down grade the increased tractive effort from this grade is more than the train resistance at that speed, so that the train would accelerate if the brakes were not kept applied. It is thus necessary to keep the brakes on until the rear of the train is around the curve. Power is then again applied and the train accelerates to a speed of 37 m.p.h. when it is again necessary to reduce the speed to 15 m.p.h. to take a crossover.

In order to determine when the train reaches a certain grade or curve some method for determining the distance traveled must be used. As already pointed out in a previous article, the area under the speed-time graph is a measure of the distance traveled. The speed-time graph can be plotted and the area measured until it is found to be just sufficient to correspond to the required distance, or a distance-time graph can be plotted at the same time as the speed-time graph. A method of determining the distance-time from the speed-time graph is as follows:

How a Distance-Time Graph Is Plotted

The speed-time graph is divided into increments corresponding to a certain increase or decrease in speed. It is assumed that the average speed of the train during this time is equal to one-half the initial and final speed and the distance which the train would travel at this average speed in the length of time taken is computed. Thus referring to Fig. 2 we find that twenty-three seconds from the start the train has a speed of 25 m.p.h. and at twenty-six seconds the speed is 26 m.p.h. The average speed for these three seconds is $25\frac{1}{2}$ m.p.h. or 37.4 ft. per second. The distance traveled will then be 3×37.4 or 112.2 ft. The smaller the increments taken the greater will be the accuracy of the calculations. Usually the same increments can be used as are taken in plotting the speed-time graph, and the two graphs can then be carried along together. In Fig. 2 the distance-time graph *OTUV* is shown constructed.

TABLE III—DETERMINATION OF EQUIVALENT GRADE FOR A RUN WITH GRADES OF VARIOUS LENGTHS

Per Cent Grade	Length of Grade, Feet	Rise in Feet	Fall in Feet
Level	250		
+0.37	680	2.516	
-1.00	700		7.000
-0.45	260		1.170
+0.44	670	2.948	
+0.26	565	1.469	
-0.38	490		1.862
Level	200		
-0.30	1,120		3.360
-1.80	1,450		26.100
Level	360		
Total	6,745	6.933	39.492

(39.492 ft. — 6.933 ft.) \div 6,745 ft. = 0.48 per cent Equivalent Grade.

Some engineers prefer to plot a speed-distance graph as an aid in determining where to stop the construction of the speed-time curve for a given grade or curve so as to conform to the conditions governing operation on the new grade or curve. In laying out signals a speed-distance graph is necessary since the spacing of the signals will depend on the distance required to stop the train from the speed at which it is traveling. Speed-time curves provide a method for determining the power and energy consumed in a given service and speed-distance curves, aside from their use in connecting up different portions of runs, also give information of particular value to the operating engineer since they show the speed at every portion of the distance. A speed-distance graph with distance plotted as the horizontal element resembles a speed-time graph in appearance, as will be seen by referring to Fig. 2. The straight line portions of the speed-time graph when the accelerating and retarding force is constant become parabolic curves in the speed-distance graph. This has led to many graphical methods being worked out for obtaining these curves, many of which possess considerable merit. I find the method of determining distance by measuring the area under the speed-time graph the most convenient.

How Equivalent Grade Is Determined

To illustrate how the uniform grade for any particular run or series of runs is determined I will calculate this for the particular run under consideration in this article. The average or equivalent grade for any section of track connecting two points is the ratio of the difference in elevation of these two points to their distance apart measured in the same units. The accompanying Table III shows a convenient method for tabulating the various steps of the calculation. The distance that the track rises or falls for each grade is computed and from this the total difference in elevation of the ends of the run is determined. This value divided by the total distance apart of the points gives the equivalent grade which is usually expressed in per cent. The use of the equivalent grades in plotting speed-time curves assumes that the energy stored in the train as a result of down grades may be used to furnish the tractive effort necessary in addition to that supplied by the motors of the train to ascend a following up grade.

The amount of energy available as a result of such grades will, of course, depend on the amount of braking necessary on the down grades to prevent excessive speeds being attained and will also be affected by the location of the stops or stations on the line with respect to the grades.

Getting a High Vacuum at the Turbine Exhaust

The Purpose of This Article Is to Show How the Faults in Condenser Design Are Being Overcome and to Emphasize This Idea: "Cool Steam in the Turbine Exhaust Is the Desideratum"

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AFTER extensive use of fairly large steam turbines had led to the development of the so-called high vacuum surface condenser it was found that its design had been based at least partially upon some serious misconceptions. It was ultimately realized, however, that there is no justification for looking upon the condenser as an end in itself. Such a conception has led to the basing of essential elements of condenser design upon principles which might be valid if its purpose were not strictly secondary, as I shall proceed to show.

High vacuum, even very high vacuum, is of no value in a power station condenser. The place for high vacuum is in the exhaust nozzle of each turbine in a power station. This statement may seem trite, but it is far from being so.

It was but a very few years ago, even after turbines of fairly large size and good economy had been placed in operation in numerous power stations, that surface condenser manufacturers were building condensers designed to produce high vacuum in the condenser. Apparently the vacuum in the turbine exhaust nozzle, was left to take care of itself. Power station engineers allowed this situation to develop seemingly in a spirit of indifference. They seem to have been dazzled by the rival claims of the several manufacturers as to the ability of the latter to produce apparatus capable of eclipsing each best previous vacuum record. But it should be noted that these records were made for that part of the condenser where the highest vacuum was to be had, that is, where the temperature was lowest.

The situation which I have described was probably brought about through the commercial relationships of the manufacturers. The turbine manufacturers made the turbine, and tried to build it of ample capacity, and reliable and economical in operation. The condenser manufacturer designed the condenser and tried energetically so to design it as to produce somewhere within it a very high vacuum. He seemed not to care particularly what vacuum existed at the top of the condenser, although he knew that it was the poorest vacuum to be found anywhere in the entire apparatus which he had turned out. On the other hand, the power station engineer did not insist that attention should be directed to it. The fact is, however, that for real plant economy effort must be concentrated upon it.

It would be difficult with entire justice to assign the credit for the bringing about of a better understanding of the vital facts in connection with condenser design.

Certainly one factor was the entry of a large turbine builder into the condenser field in competition with the firms building condensers and accompanying auxiliary apparatus.

Until this better understanding was brought about great attention and much misdirected analysis was devoted to such matters as temperature of hot-well water and cooling of air previous to its extraction by the air pump. This pump, by the way, was generally of the

reciprocating and so-called "dry" type and as such was much affected in volumetric efficiency by the temperature of the air suction. At the same time an enormous amount of attention was devoted to formulating and experimentally determining the laws of heat transfer through condenser tubes, and to expressing such transfer in terms of an average thermal transmission coefficient. All

of the talk about the "contraflow," that is, bringing the hottest steam into contact with the warmest water, and its part in establishing the average heat transmission coefficient, missed the real point. In fact, the whole discussion of the surface condenser as an apparatus through which heat energy was transferred at a very rapid rate missed the point, because it placed the principal emphasis elsewhere than upon the ways and means of creating the utmost vacuum at the top of the condenser. That is to say, the discussion should have centered in the production of high vacuum in the connection between the condenser and the turbine where this high vacuum can do some good to the turbine and accordingly can improve the plant economy.

The Mass of the Exhaust Steam Must Be Taken into Account

As soon as designers realized that they had been putting the emphasis at the wrong place several notable changes in practice were quickly evident. The basis of contract relationship changed. Guarantees of turbine economy as affected by condenser performance came to be based, as they should always have been based, upon the vacuum between the turbine and the condenser. Condenser manufacturers, with some alarm, took into consideration the pressure drop through the tube banks instead of practically closing their eyes to it as formerly. The great congestion of heat transfer in the upper tubes of the upper bank, with its accompaniment of shockingly ineffective utilization of costly material in the lower tube bank, received at last the attention which it deserved.



That's a good vacuum, and it's in the turbine exhaust at that

Steam leaves the turbine in an extremely attenuated state. However, it has mass, and on entering the condenser it has great momentum due to its enormous speed. The mass and the momentum must be taken care of in the design or great quantities of steam will penetrate far into the condenser before interference with the steam path occurs. This fact gradually dawned on condenser designers, and more and more they have arranged the tubes in graduated density instead of having them uniformly packed in close formation.

The Coolest Water Must Be in Contact with the Hottest Steam

But even yet the inertia of past conceptions has not been entirely overcome. The contraflow principle and its relation to the average thermal transmission coefficient, in the writer's opinion, stand in the way of progress. The intake circulation water is cool. Because it is cool it has great *potential* power to extract heat from the cool steam in the turbine exhaust nozzle or the condenser inlet, and this potential power should be utilized. Cool steam is steam at very high vacuum, and obviously if it is the turbine exhaust or condenser entrance steam which is the cool high-vacuum steam the turbine benefits and hence good plant economy results.

All talk about keeping up the average thermal transmission coefficient, cooling the air so that the volumetric efficiency of the air pump may be high, etc., is quite beside the mark. The air which must be removed from a condenser is air which leaks into the condenser structure. It makes no difference at what temperature this air is removed nor what volumetric efficiency the air pump may have while in the act of removing it. The air coming into the condenser through the turbine exhaust mixed with the steam in accordance with Dalton's law* is a quantity practically negligibly small. But if the exhaust nozzle steam is to be cool steam and yet if it is to have its heat (its enormous latent heat) extracted in the condenser it must come in contact with cool water. *Cool steam in the turbine exhaust is the desideratum.*

Modern Condensers Have Graduated Tube Spacing

Instead, therefore, of the earlier forms of so-called high-vacuum surface condensers, marred by great pressure drop from the turbine exhaust nozzle to the hot-well or to the air pump of the dry vacuum or ejector type caused by closely packed tube banks, we now have condensers of various forms of shell. Sometimes these are V-shaped with graduated density of tube spacing, allowing greatly increased penetration of steam to the lower tube bank.

Devices, such as rain plates, designed to prevent the cooling of water of condensation while making its way to the hot-well are now recognized as contributing to pressure drop through the condenser. In causing this pressure drop they create an evil far worse than that which they are designed to alleviate. In consequence they have been abandoned in design, and in some cases where originally installed they have been removed.

Contracts and turbine economy guarantees are now

based upon the vacuum which the condenser is capable of maintaining in the turbine exhaust nozzle. The average temperature, or an approximation to the average yearly temperature of the intake circulating water, is now used as a basis of guarantees instead of a nominal and rather high temperature. A very late conception is the necessity of providing gradual acceleration of the air flow from the pocketed air cooled space of large cross-section to the far smaller cross-sectional area of the air suction from the condenser to the air pump, thus avoiding a baneful pipe entrance pressure loss.

The fundamental fact of surface condenser performance is that, with contraflow, the temperature of the discharge circulating water establishes the potential capacity for heat withdrawal from the turbine exhaust steam. An ideal condenser employing this principle could do no better than bring the turbine exhaust steam temperature down as low as the circulating water discharge temperature. Of course, the temperature of the turbine exhaust steam establishes its absolute pressure and therefore its vacuum.

Condensation Congestion Must Be Avoided

Only to the extent that steam can penetrate to the tube bank containing the cool intake circulating water can this bank condense steam and in so doing relieve the congestion of condensation in the region where the turbine exhaust steam first finds itself. Congestion of condensation cannot occur unless there occurs a sufficiently large difference of heat potential. For this to be large the turbine exhaust steam temperature must remain far above the temperature of the discharge circulating water temperature, which temperature is fixed by the initial temperature and the rate of flow of the circulating water and the extent to which the heat of the exhaust steam is imparted to it. Contraflow condensers frequently absorb as little as 15 per cent of total heat in the lower pass, which pass, of course, having the cool water, has far greater potential heat-absorbing capacity than the upper pass.

This shockingly inadequate sharing of the load by the lower pass, with consequent overloading and inefficient operation of the upper pass, can be maintained as a condition of unbalance in one or both of two ways: Either the lower tubes with the cool water may be drowned in a cloud of air, or the tubes of the lower pass may be surrounded by cool steam. As air is a good heat insulator, obviously the first condition results in low heat absorption. Again, as cool steam is necessarily steam of low absolute pressure (in other words, steam at high vacuum) we have a condition where there is high vacuum steam in the lower part of the condenser, while in the upper part there is steam of higher temperature and therefore a lower vacuum. There is consequently a large steam pressure drop through the condenser. This latter obviously cannot exist unless the design embodies tubes in close formation, hence the modern tendency away from this arrangement.

Air in Condensers Presents a Rather Complicated Problem

The case of the insulating cloud of air is not so simple. All the air which leaks into a condenser is removed as fast as it enters by the air pump, no matter how bad

*Dalton's Law. "This states that, if several gases which do not react on each other are put inside a certain vessel, the mixture becomes uniform throughout, and the pressure at any point is the sum of the pressure which each gas would produce if it occupied the vessel by itself." Amer. "Theory of Physics," page 125

the air leakage nor how poor and inadequate the pump. Otherwise equilibrium conditions could not obtain. But the essential thing here is not the *rate* of air entrance nor the equal *rate* of air removal. The essential thing is the *mass* of air existing in the condenser at any given time. A good financial analogy of this can be found in one's bank balance, which is quite distinct from the rate of depositing and the rate of checking out the account. If air leakage into a condenser is high it will require a pump of large capacity to remove air at a uniform rate *at low absolute pressure*. But still more vital than its volumetric capacity is the *limiting absolute pressure* at which the pump *can* remove air. Its limitations in this regard are fixed by its design or to its state of mechanical excellence with respect to maintenance, or to both jointly.

This point determined, it is obvious that the mass of the cloud of air in the condenser will be determined by the limiting absolute pressure and by the volumetric displacement of the pump in unit time. The product of these (times the gas constant) is the mass of air removed by the pump in unit time, which is necessarily equal to the mass of air entering the condenser in unit time. The mass of the cloud of air in the condenser, or, referring again to our analogy, the "bank balance," adjusts itself in such degree as to establish this entrance-exit equation.

Good Condenser Pump Maintenance Is Essential to High Vacuum

If the air leakage into the condenser is moderate and remains constant, but if at the same time the pump undergoes service deterioration for want of maintenance, the cloud of air in the condenser will *compress* until the deteriorated pump can take out the leaking quantity at higher absolute pressure than before; in other words, at lower vacuum. This compressed air, *occupying in the condenser the same space as before*, will have greater mass. In consequence it will have much increased heat-insulating ability and by reducing the heat absorption of the lower pass will overload the upper pass, since the entire heat coming in with the steam from the condenser must be absorbed. This overloading of the upper pass still further lowers the vacuum and thus in this manner a cumulative effect is secured.

In recent years an expedient extensively adopted is to provide a pump of very great volumetric capacity and of design inherently capable of working at very low absolute pressure, a pump of the rotary ejector type. This solves the problem of high vacuum maintenance but often at the expense of rather high power required for driving. With such a pump, if the air leakage into the condenser is slight, a source of extravagance is tapped.

As the volumetric displacement is large the pump will draw out steam when there is but little air to extract. This steam in consequence does not get into the hot-well as condensate and therefore is not returned to the boilers. This is a source of loss not always realized, but it is recognized by those who have given it proper consideration. Turbine guaranteed economy tests are not run with such pumps in action if test facilities exist for making temporary use of pumps of moderate volumetric capacity.

New Type of Lightning Arrester Makes Its Appearance

The "Oxide Film" Arrester Has General Properties Like the Aluminum Cell Arrester but Also Has Virtues All Its Own

AN IMPORTANT development in lightning arresters was announced in papers at the recent A. I. E. E. convention at Atlantic City by Charles P. Steinmetz, General Electric Company, and Crosby Field, United States Ordnance Department, who gave structural and operating details of the new "oxide film" arrester. This has now been in service long enough to demonstrate its practical qualities so that the authors felt safe in giving out details. The functioning of this arrester depends upon the fact that certain dry chemical compounds can be changed with extreme rapidity from very good conductors to almost perfect non-conductors by the application of slight amounts of heat. Lead peroxide is a good example of this property and this compound is used in the commercial arresters.

Lead peroxide is normally a powder. If, however, it is placed between two electrodes and a current is passed

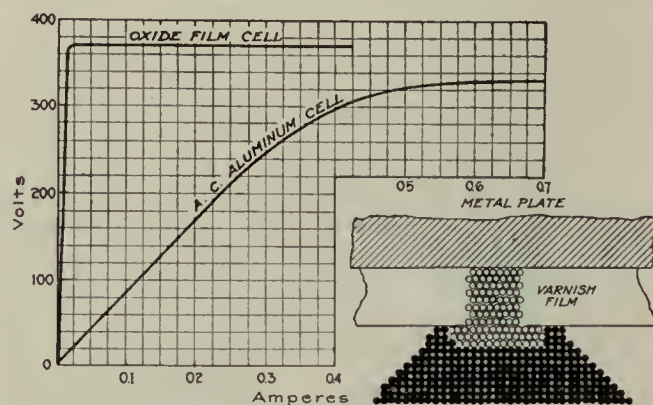


FIG. 1—VOLT-AMPERE CHARACTERISTICS OF OXIDE FILM AND A. C. ALUMINUM ARRESTERS. FIG. 2—CONVENTIONAL DIAGRAM OF LITHARGE PLUG STOPPING GAP IN OXIDE FILM ARRESTER

through it, there will be a rise in temperature due to the resistance at the contact of the peroxide and the metal. This causes heat to be generated at points on the surface, and when the temperature has attained a value of 150 deg. C. a film of lower oxides forms. This film is a non-conductor and it interrupts the current. The formation of the film by this means is, however, rather irregular and in the commercial arrester the electrodes are dipped in varnish or lacquer for the purpose of producing a uniform film.

The commercial arrester consists of two sherardized steel disks, 6 in. or more in diameter, spun on the two sides of a porcelain ring, the interior space being filled with the peroxide. The distance between electrodes is about $\frac{1}{2}$ in. Either one or both of them is covered with a thin insulating film.

When such a cell is subjected to a voltage up to about 300 the insulating film prevents any appreciable current from flowing under normal conditions (see Fig. 1). As soon as the voltage rises slightly above this value the film punctures in one or more microscopic points, the lightning charge meets with practically no resistance

and flows to earth. The dynamic current starts to follow but because the insulation was punctured in very fine points the current density near these points is exceedingly great. There is thus a localized heating to a value sufficient to change to insulating litharge all of the conducting peroxide in this minute path of the current flow in contact with the electrodes. The film consequently reseals, stopping further flow of the dynamic current. The action is so rapid that the resealing occurs in less than one four-thousandth part of a second after the excess of lightning voltage has ceased. Fig. 2 represents in a conventional manner the way in which a litharge plug, indicated by the white circles, promptly fills the gap in the film.

In applying the cells commercially they are piled upon each other, to a number depending upon the voltage of the circuit, with a spark gap in series. As they are hermetically sealed, because the metal of the electrodes

it, the electrodes are coated with a thin non-conducting film of alumina, which grows in thickness until it holds back the impressed voltage. Any over-voltage punctures this film, but the current passing through the puncture hole again forms alumina and closes the holes. Thus the aluminum cell acts like a self-repairing electrostatic condenser of a disruptive strength equal to the impressed voltage, about 250 to 300 per cell. On account of its excellent protective qualities the aluminum cell arrester has been adopted very generally in high-power circuits in spite of the inconveniences incident to the need of daily attention in charging, the use of a liquid electrolyte, and the difficulty of testing the arrester without taking it apart except by watching the appearance of the charging arc or measuring the charging current.

The oxide film arrester does not require any charging and thus needs no special attention; it contains no



FIG. 3—OUTDOOR TYPE OF OXIDE FILM LIGHTNING ARRESTER FOR USE ON 15,000 TO 25,000-VOLT CIRCUITS

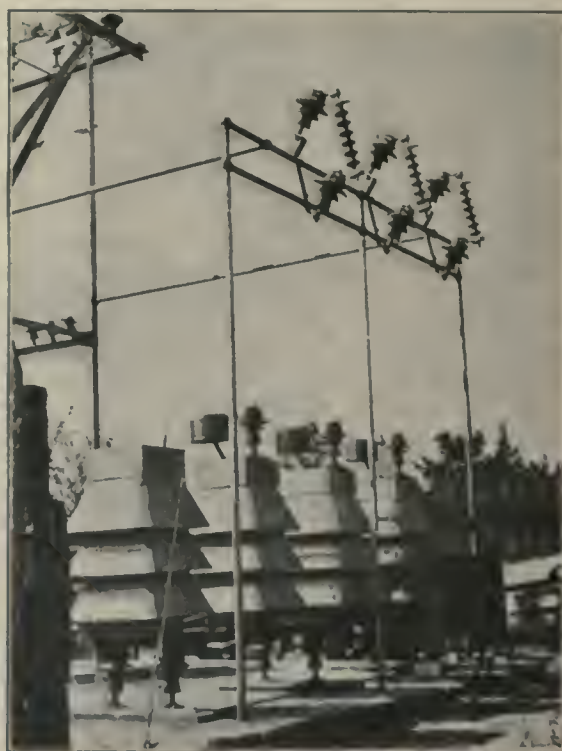


FIG. 4—OXIDE FILM LIGHTNING ARRESTER INSTALLED ON 33,000-VOLT CIRCUIT

is spun over the porcelain separating rings, the cells can be installed out of doors as well as indoors, requiring in an outdoor installation merely some protection by petticoats to keep the rain from short-circuiting the cells. An accompanying illustration shows the details of mounting for a high-voltage arrester.

In order to render the arrester "instantaneous" in its action, the horn gap inserted in series with the cells is shunted by a properly proportioned sphere gap, which for outdoor use must be shielded from the weather. A protected sphere gap which has been designed for this purpose is shown in one of the illustrations.

The aluminum cell arrester comprises a series of cells—usually conical and stacked into each other—of aluminum electrodes, with an electrolyte of which neither the salt nor its ions appreciably dissolve alumina. In "forming" the cell by an alternating current passing through

liquid electrolyte of inflammable material, and like the aluminum cell arrester it can be located out of doors as well as indoors. Fig. 1 shows comparative volt-ampere characteristics of the oxide film arrester and the a.c. aluminum arrester. Both of these arresters have a leakage current which wears the plates of the cell when alternating current is supplied and it is necessary to place a spark gap in series with the cells. This spark gap is set at a value slightly above the normal potential of the circuit so that nothing but abnormal voltages will cause a discharge.

It is seen, then, that the oxide film arrester has general characteristics closely like the standard aluminum electrolytic arrester and in addition it has obvious advantages, due to the facts that it is dry rather than wet, that it will not congeal and that it needs no daily charging.

Money-Saving Factors in the Maintenance of Special Work

By R. C. Cram

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For Economical Maintenance There Must Be Intelligent Selection of Types of Special Work, Careful Workmanship in Installation, Accurate Records of Performance and Prompt Attention to Needed Repairs

SPECIAL track work is the most expensive part of a street railway track system, both in first cost and in maintenance. It is no uncommon sight to see a special-work layout which has cost \$10,000 or more confined within the limits of a 60-ft. street intersection. In pre-war times, special work would cost in place and paved from \$10 to \$15 per foot of single track, which is about double the cost of plain, tangent track. Slot-rail underground conduit construction cost much more than any other type, as indicated in the article by H. P. Hunting describing an installation of this type in Washington, D. C., which appeared in the *ELECTRIC RAILWAY JOURNAL* for June 15, 1918. The installation referred to was stated to have cost \$56,239.19 net. The detailed cost figures indicated a unit cost of \$65.90 per foot of single track for the special work in place and about \$14 per foot of single track for adjacent tangent slot-rail track.

These references to cost are made for the purpose of emphasizing the fact that special-work maintenance is a very important feature in the work of the way department. It hardly seems necessary to say that such high costs should be the only warrant needed for the expenditure of money in making frequent inspection and timely repairs. It may also be noted that high renewal costs often create a tendency or desire to keep

a layout in service as long as possible and often beyond the time when renewal is properly due. In these times, particularly, it is difficult to secure the combination of material, labor and funds which is essential to good maintenance, and very careful planning is needed to make the best use of whatever parts of this combination may be available.

There are a number of problems and features of special-work maintenance which are more or less common to an electric railway, and an attempt will be made to present some of them in this article. While the methods and practices described are thought to be those prevailing generally, there are several factors which influence their application to individual systems. Among them are the following: (1) Size of the road in terms of mileage. (2)



What would we have done without these records of special work?

Number of special-work layouts. (3) General characteristics of the system with respect to whether it is a city system, an interurban system or a combination of the two. (4) Character of the special-work layouts with respect to relative simplicity. (5) General character or type of special-work construction in use. (6) Wheel contours and settings. (7) Type, weight and schedule of cars.

The first item naturally determines the second as it follows that, regardless of the general characteristics of the property, there is a fairly well fixed relation between track mileage and the amount or number of special-work layouts required for operation. Judging

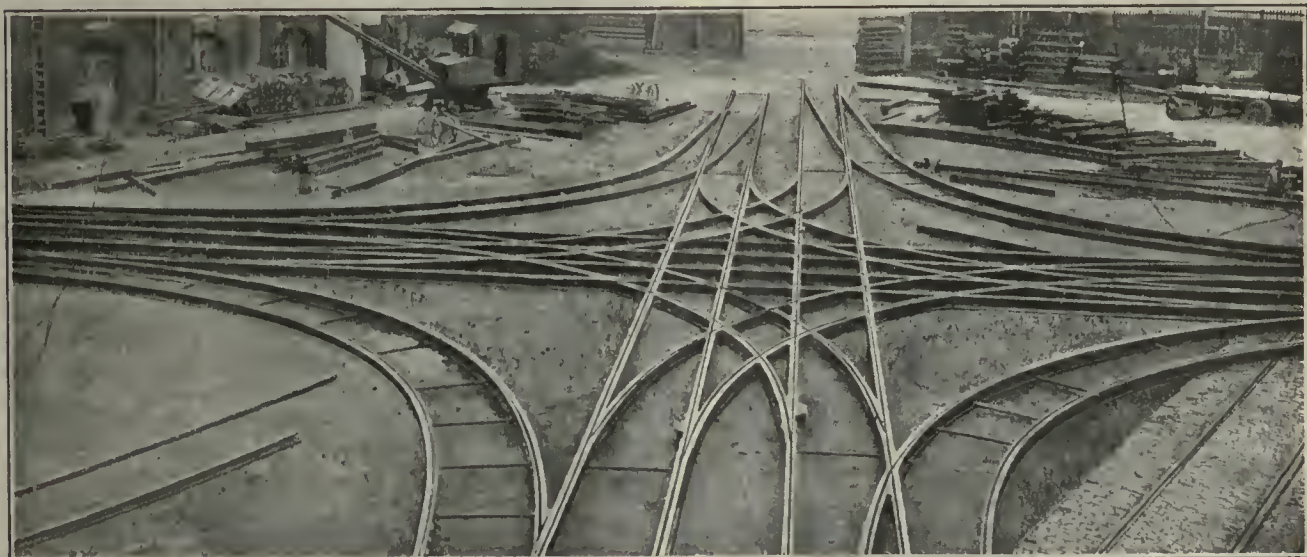


FIG. 1—SPECIAL COMPLICATED HEAVY SERVICE TRACK SPECIAL WORK LAYOUT FOR INSTALLATION ON CHICAGO SURFACE LINES

from the rather meager information available, we may assume that as a rule there are from one to two layouts per mile of single track. The second item will largely determine the amount of maintenance which must be undertaken in order to keep the work in good operating condition, although the car schedules and weight of cars also have an important bearing on this item. The third item will determine the type of construction used. Large city properties usually require deep rails, heavy castings, sharp curves, tongue switches, and pavements. Interurbans usually require standard-section rails, spring frogs, split switches and little or no pavement. Combined systems naturally require both of the foregoing.

There Is a Wide Difference Between City and Interurban Special Work Layouts

The fourth item can be traced through item No. 3. City systems, especially where double tracked, have a great many complex layouts. Interurban systems, on the other hand, have very simple layouts, such as turnout ends, and long, easy, plain curves. Combined systems have their share of both complex and simple. It may be of interest to note this difference in character by comparing the complex city layouts shown in Figs. 1 and 2 with the familiar simple interurban turnout.

The fifth item in turn, shows the influence of the characteristics indicated in items Nos. 3 and 4. The



FIG. 2—COMPLICATED GRAND UNION TRACK SPECIAL WORK LAYOUT SET UP IN MANUFACTURER'S YARD FOR ASSEMBLY

complex city layouts, requiring heavy castings, deep rails, tongue switches, sharp curves and expensive pavement, naturally cost more to maintain than the more simple interurban construction where split switches, stiff or spring frogs and easy curves are used ordinarily with little or no pavement. It will be seen that repairs to special work of the city type will require the greater expense, just as

it is also clear that it will require the greater outlay for original construction, not only for the work itself but also in labor cost for installation.

As to the sixth item, wheel contours and settings have a greater bearing on maintenance of special work than appears at first. On city systems, the wheel treads are comparatively narrow. (About 21 in. is the prevailing width.) On the other hand, interurbans or roads operating solely upon private right-of way have cars with wheel treads 3 in. or more in width. Narrow treads are particularly hard on frogs and mates because such treads will not fully span the flangeways, thus leading to rail-head cutting. To a certain extent this may be offset by the use of flange-bearing frogs.

The proper maintenance of accurate wheel setting or gage will lessen special-work maintenance. Wheels which are set or which become out of gage beyond tolerance limits will strike frog and mate points severely, will cause excessive wear of guard rails and will often



FIG. 3—ONE SECTION OF KEY OR INDEX MAP OF SPECIAL WORK LAYOUTS ON A LARGE CITY SYSTEM

lead to costly derailments. If it is necessary to provide for more than one type of wheel contour, additional maintenance can be expected because it is almost impossible to design special work to suit different contours and at the same time satisfy the principles of correct design.

The last item refers to type, weight and schedule of cars, which influence design. For example, if it is necessary to operate both single and double-truck cars around the same sharp curves, the guard rail grooves must be ground excessively to suit the single-truck wheelbase, and more than is necessary for double-truck wheelbases. Hence the guard rails have less wearable metal in them and they will require more frequent re-

SKETCH OF LOCATION AND LAYOUT	Location _____ No. _____		
	Plan No. _____	File No. _____	
	Original	Renewals	
	Regulation		
	Ta. Pur. Agt's for bids		
	Order No.		
	Date ordered		
	Manufacturer		
	To be shipped		
	Received		
	Request No.		
	Authorization No.		
	Installed		
	Costs: (mark)		
	" paving mat'l		
" other mat'l			
" track labor			
" paving labor			
Total cost			
Places installed			
Max'tm' dr's No.			
Foreign S. P. No.			
Man't' replaced			
Remarks:			

EXPLANATORY
Black—Old Work
Red—New Work
Dotted—Original
Layout if changed

FIG. 4—CARD RECORD FOR COMPILING COSTS, ETC.

REPORT OF SPECIAL WORK DEFECTS			No. _____
Date _____	Desc. _____	Location _____	
Installed _____	Repaired _____	Make _____	
Switches—Tongues			
Castings _____			
Centers _____			
Mates _____			
Castings _____			
Centers _____			
Frogs _____			
Castings _____			
Centers _____			
Rolls _____			
Joints _____			
Paving: Kind _____	Condition _____		
Foundation _____			
Remarks _____			

FIG. 6—FORM USED IN REPORTING SPECIAL WORK DEFECTS

newal. The weight of the car, its equipment and the load carried, determine the load upon each wheel and it follows that, with a given car schedule and type of car truck, a heavy car will do more damage than a light one. On the other hand, it is believed that a very frequent service with fairly light-weight cars will cause about as much wear as a less frequent service with heavy cars.

Type of Special Work Also Influences Maintenance Costs

There are four general types of special-work construction, each of which has its peculiarities and requires a different degree of maintenance under equal traffic conditions. These types are: (1) Plain bolted; (2) cast steel, hard center; (3) iron-bound, hard center, and (4) solid manganese.

The plain bolted type includes both split switches and spring or stiff frogs used in open track, as well as the built-up tongue switches, open-point mates and frogs,

which may be used in city work but their use determines characteristics which practically make a distinct type for each class of service. Each of the four general types mentioned has its peculiar field of service although the iron-bound hard-center type is often used under the same conditions which control the use of the solid manganese type.

There is no measure by which the performance of the various types may be compared except by installation under similar conditions of service in a given location. Neither is there any means, except general observation, by which the service of a particular type on one road may be compared with that of another road. This will explain, to a certain extent, why the use of

TRANSIT DEVELOPMENT CO.											
WAY AND STRUCTURE DEPARTMENT											
REPORT OF SPECIAL WORK INSTALLATION AND REPAIR											
LINES											
PARTS RENEWED OR REPAIRED					DISPLACED		COSTS				
	Pc. No.	Constr.	Maker	Order	Constr.	Maker	Sp'l W'k	Ord' Mat'l	Labor	Total	
Layout											
Switches											
Mates											
Frogs											
Rolls											
Hard Centers											
Joints											
DISPLACED MATERIAL (See Above)							Total Cost of Track Work				
Piece Nos.					Value		Paving material				
Good for O.M.S.							Paving labor				
Scrap							Total paving				
							Total cost of work				
							Deduct total value displaced material				
							Net Cost				
EXPLANATORY					SKETCH LAYOUT AND INDICATE WORK DONE						
Black—Old work											
Red—New work											
Dotted—Original layout, if changed											
Hard center renewed					X						
Hard center tightened					u						
Joint repaired					✓						
Tongue renewed					Δ						
Roll's _____											
Auth. _____											
Started _____											
Completed _____											
Location _____					No. _____						
Engineer Surface Lines											
DIRECTIONS—On this form will be reported all expenses incurred account maintenance of special work of whatever description, which report will be supplemental to that on Form G.											
Report should be made in triplicate, the Original (white) and Duplicate (pink) copies to be forwarded to Engineer Way and Structures, the Triplicate (blue) to be retained.											

FIG. 5—FORM USED FOR REPORTING ON SPECIAL WORK INSTALLATION AND REPAIR

some one type will prevail on one road while some other type is thought best on another road.

There are as many types of hard-center fastening devices as there are manufacturers of special work. This is true also of tongue-switch construction details. Each may have merit, but as yet there is no general tendency toward settling upon a combination of the desirable features into one general type. If this could be done, there would be a great decrease in maintenance cost, owing to the reduction in the number of parts which must be carried in stock, to say nothing of the reduction in price which should come with a reduction in the number of patterns. At present, however, patents and royalties have prevented much progress in this direction, although in solid manganese layouts there is a substantial agreement in many details of construction which has been effected through the efforts of the Manganese Track Society, an association of special-work manufacturers. Incidentally, reference may here be made to two extensive articles, describing methods of

fastening and maintaining hard centers, which appeared in the *ELECTRIC RAILWAY JOURNAL* for Sept. 19, 1914, and July 25, 1914, respectively.

Maintenance expense will, in a fair measure, be determined by the type of construction selected for a particular service and more study should be given to this selection than has heretofore prevailed. There is no doubt but that much good money has been wasted through the selection of a type not suited to the car service it was required to care for. The economical side of the question has not always been carefully considered. For instance, it has been definitely determined that one costly manganese layout may not always be as economical in a given location as two or even three less costly types of work, when interest on first cost is taken into consideration. Some interesting data on this point were included in an article by M. Bernard which appeared in the *JOURNAL* for Oct. 6, 1917.

Records play a large part in the work of maintaining special work. It is essential that information should

A record card for such a system is shown in Fig. 4. Other forms which have been found useful are those shown in Figs. 5, 6, and 7. That shown in Fig. 5 serves to notify all concerned that certain work on schedule is about to be started, calling attention to any changes in orders. Thus, also, if for some reason unknown to the field forces the work should be deferred proper instructions can be given.

Fig. 6 is a form for reporting defects, while Fig. 7 shows one used for reporting emergency defects, such as broken switches, tongues or other items requiring immediate attention. This latter form is filled in by the telephone operator who receives the report, and then it is either handed to the emergency crews, or repeated over the telephone when the crews call in for instructions.

Naturally, the use of so many report forms is not essential on comparatively small systems, where one or two department heads may have the work under close control, but upon systems having hundreds of scattered

Call No.	EMERGENCY TELEPHONE REPORT				No.
Date	Call No.	Date	Time	M. Location	
Location	Nature				Reported by
	Part	Make	Type	Place No.	
	Line ..	Track ..	Rail		
	As found				
	Cause				
	Repaired: Date	Time	M. By		
	Remarks ..				
Dep. to Eng. W. & S.					
Date					

FIG. 7—FORM USED IN EMERGENCY REPORTING OF SPECIAL WORK DEFECTS

be ready at hand covering such matters as location, type of construction, replacements, betterments, abandonments and costs. For the purpose of location, it is the custom to prepare a small-scale key map of the system, upon which all layouts are shown and given numbers. These numbers are used in correspondence and upon all plans, serving to identify the job even though the description by streets may be in error. When this system is in use it is a custom to have all manufacturers' plans show their numbers in addition to the company's own record numbers. Such a key map is shown in Fig. 3.

Further, it is a good plan to prepare drawings to a scale of $\frac{1}{8}$ in. = 1 ft., showing each layout or location, with all essential engineering data thereon, such as piece numbers, angles, lengths, street widths, obstructions, etc. These are usually made to one scale and as far as possible upon one standard-size sheet. Blueprints from these plans can be used to good advantage in the field for marking those pieces which require renewal or repairs. They save a great deal of writing and sketching, and consequently time, which is essential when getting up annual repair programs. When there are many layouts some sort of card-record system is the best method of keeping track of renewals, repairs and costs.

layouts forms of similar type will be found in almost universal use. It may also be noted in passing that the large systems ordinarily assign an assistant engineer or a special-work engineer to take charge of the numerous plans, schedules, records and estimates which are essential to well-ordered maintenance.

Another purpose served by adequate record systems is the accumulation of data upon the lengths of service of different types of construction in the same location. From such data it is possible to judge whether any particular type of construction is suitable for a given location and what modifications may be incorporated in renewals which will tend to improve the service given. Good records are invaluable in case of necessity for making an appraisal of a property, and for use in making charges or deductions from capital which may result from changes in type of construction.

But the best system of records ever invented, even if well kept up, will not of itself maintain the special work. It is only through constant effort and by taking the "stitch in time" that it can be properly maintained. One of the first principles of maintenance is that faulty installation will do more toward destroying the most substantial special work than thousands of cars. Good track work deserves a good foundation, and every pos-

sible precaution should be taken to see that it is secured. Much good special work has been destroyed before its time, and the manufacturers have been blamed for its short life, whereas the blame more properly should have been attributed to lack of care on the part of the railroad company in installation and maintenance. It is common to see a complete new layout going in upon a bed of old ties. It is even more common to observe partial renewals being made on old and badly worn ties, sometimes with shims of various sorts to bring up the level. The use of special tie layouts is not so common as it should be, and the old method of interlacing ties of standard length still prevails on many roads. This may not be true in open track work where there is every opportunity for easy installation of the longer timber used in special tie layouts, but in city work the installation of ties longer than the standard length of 8 ft. is somewhat difficult, especially where traffic must be maintained, because of pavement interference. These factors are apt to make the use of special ties appear unfavorable in spite of the known fact that it is almost impossible properly to tamp ties when closely interlaced, even with a pneumatic tamper.

It is possible, however, to use switch timbers, even under these seemingly adverse conditions, to an extent which will greatly benefit the stability of the installation. This can be seen by reference to Fig. 8, which is for use in renewal work where a complete special tie layout cannot be installed except at very great expense and with excessive delays to traffic. Furthermore, it is considered essential that all special work should be installed upon special tie layouts wherever possible, and as a rule only

very heavy traffic conditions combined with very complicated special work will prevent their use.

The advantage gained by the use of special tie layouts is made even more evident by the results in increasing the life of railroad crossings through the installation of the special steel tie foundations. These have been rapidly coming into general use, not alone for railroad crossings but also for crossings strictly confined to street railway service. Another factor which affects the wearing qualities of special work is ballast. Many failures of special work, particularly of the iron-bound, hard-center type, both at joints and at the junctions of the centers with the rail arms, can be traced to lack of a good ballast foundation, well tamped under the ties. It is safe to say one of the chief factors in causing high maintenance expense has been the lack of

use of adequate specifications for special work. Until recently there were none available except those prepared by the large companies for their own systems. Even these were not always sufficiently careful in detail to describe accurately all of the essential features. This situation often led to the acceptance of inferior material upon the lowest bid obtained by the purchasing agent, and the engineer of way had nothing but his observations to back up his claims that the special work supplied was of inferior quality.

The recommended standard specifications for the various types of special work and for materials entering into its manufacture, which were adopted by the American Electric Railway Engineering Association in 1916, represent a long step in advance. A glance through any one of them will make clear why they were needed.

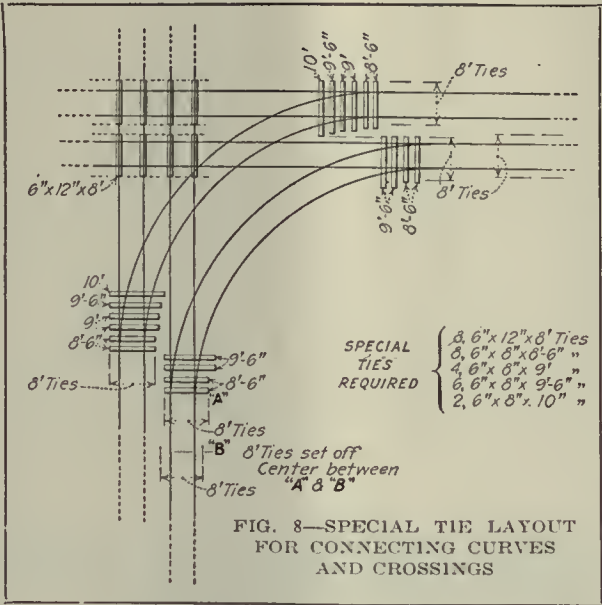


FIG. 8—SPECIAL TIE LAYOUT FOR CONNECTING CURVES AND CROSSINGS



FIG. 9—STOCK OF STANDARD SPECIAL WORK IN A STORAGE YARD



FIG. 10—CRANE CAR ASSISTING IN INSTALLATION OF HEAVY RIGHT-ANGLE CROSSING

These specifications leave nothing in doubt; every detail essential to good material and workmanship is covered and all manufacturers are placed upon the same footing in bidding under them. A more general use of these specifications by the railway companies, combined with manufacturing inspection at the plant, would undoubtedly lead to a lessening in maintenance charges.

Standardization in This Field Is Making Some Progress

The influence of standard designs on special-work maintenance is very marked. Almost every system of any considerable size has at least adopted standard engineering data, piece lengths and radii for crossovers and turnout ends. In most cases the standard lengths of switches and mates are those of the Engineering Association. The general engineering data are usually those found in the catalogs of the several manufacturers, and those data are applied to all crossovers and turnouts of the same radius, no matter by whom the work is ultimately manufactured. Simplicity is gained in this way and the number of repair parts to be carried in stock is generally reduced, while the renewal of worn parts is facilitated. In a similar manner standardization can be carried into more complicated layouts, as can be seen from the following quotation from an article by Burr S. Watters, assistant engineer of way of the Columbus Railway, Power & Light Company, on interchangeable special-work layouts. This article appeared in the issue of the *ELECTRIC RAILWAY JOURNAL* for May 6, 1916. After describing how the Columbus standards were designed upon standard grand unions as a starting point, including the exclusive use of right and left-hand switches of 97-ft. 7½-in. radius, of association standard lengths, Mr. Watters says: "The number of standard frogs has been cut down. * * * We have been able to obtain much better deliveries. * * * Furthermore, these standards greatly facilitate the laying out of special work. Instead of spending much time in trying to obtain the best possible design, the problem simplifies itself into determining which of the standard designs best fits the conditions imposed. These standards are also valuable because most of the pieces are interchangeable. This permits a certain number of pieces to be carried in stock, thus eliminating delays that occasionally occur in emergencies. After all of these advantages are considered, and from our experience with these standard layouts during the past five years, we feel very well repaid for our work in preparing standards, and we know that we are in a much better position to make original layouts or renewals than we were before their adoption."

It is a custom on most roads to prepare a program or schedule of the special-work renewals and repairs which will be required during the year. The preparation of such programs requires both experience and good

judgment. As a rule, on the smaller systems, the track foreman prepares a list of items of work which the roadmaster checks and revises and forwards to the engineer of way. The engineer makes such inspections as he deems advisable and prepares requisitions for the material. On large systems the special-work engineer makes up this program, acting in conjunction with the roadmaster, while requisitions are prepared by the engineer of way.

Inspections under these programs are usually made annually and programs are revised to suit the individual cases at the time of making requisitions. The engineer usually prepares plans for submission with requisitions, upon which bids can be taken. Where possible, it is also a custom to order renewals and parts from existing plans, after checking details against possible changes which may be found in the field. Sometimes the manufacturers are requested to send their engineers to make the measurements. In conjunction with such programs it is also a custom to prepare a budget of the estimated cost of the entire work, which is submitted to the management for approval. Actual work

is again later approved under the regular authorization procedure obtaining. In the actual work of renewals, a regular procedure is necessary and a work order system as used in Denver and described by W. L. Whitlock in the *JOURNAL* for Nov. 10, 1917, can well be applied. Here the foreman receives a set of instructions giving each operation in its proper order. Much of the work must be done at night, and always at great



FIG. 11—USING THE ARC WELDER IN REPAIRING A FROG

disadvantage. It is often necessary to install portable crossovers and other temporary track in order to permit the work to be done. Crane cars are a great help towards saving labor and time in this work as they readily lift the heavy parts, leaving the men free to work at actual installation instead of tiring themselves by handling heavy castings. In the absence of crane cars, a team of horses will serve the same purpose, although the speed of installation is much slower.

Arc welders and rail grinders are two indispensable tools which are used in special-work maintenance. The welders serve to build up cupped rail heads and battered frog points, while the grinders smooth down the welds after these have been completed, deepen flangeways, grind frog and mate points, and remove "fins" from switch-tongue castings.

It is desirable, in special-work maintenance, to have one or more foremen who are particularly skilled in the various operations necessary to carry on the work over which they have supervision. Many men who are good track foremen and as such render valuable service in taking charge of the usual repairs to tracks, are not necessarily well qualified to maintain special work. There are many "tricks of the trade" which a special-work foreman and a well-trained gang can apply to the work, so as to make certain that it is done properly and with a minimum consumption of time.

Applying Engineering Principles in the Design of Trucks

By Norman Litchfield

Some Facts About Trucks Which Should Be Understood by Every Truck Purchaser and Maintainer

THE standard types of trucks in general use to-day are of designs which have been developed partly by experimental service and somewhat by a study of engineering principles involved in the structure. By reason of the character of the work it has to perform it is a difficult matter to analyze in any complete manner the strains to which the truck structure is put. Hence even the most careful study from a theoretical standpoint must be supplemented by experiment and service. Certain fundamental factors, however, can be determined simply, and these have a large bearing on the successful issue of any design. As in the study of any structure it is necessary first to ascertain the chief external forces acting upon the truck. The conditions are quite different from those surrounding the design of a bridge truss, for example, which is stationary and has varying force applied to it through a combination of the dead weight of the structure itself, the rolling load of locomotives, cars and other vehicles, and the addition of wind pressure together with an ice and snow load. In designing a bridge structure careful attention also has to be given to the stresses which may be set up in the course of erection. These are quite different from those caused by the normal loading, and often prove exceedingly troublesome.

In the case of the car truck, on the other hand, the structure is not stationary, but instead has to be carried along at a high rate of speed over uneven rails, on poor roadbeds which subject it to continual pounding, and around curves which apply severe side thrusts and which have a tendency to distort the structure in every conceivable manner.

Eight Points to Consider in Regard to Truck Loading

Before proceeding to analyze the forces acting on the truck it will be convenient to enumerate briefly the chief factors which require study. These are:

1. The weight which is carried with the car standing straight.
2. The shifting of this weight from one side of the truck to the other by the action of centrifugal force.
3. The shifting of a portion of the load from the rear truck to the front truck by the action of the brakes.
4. A similar shifting of the load from the rear pair of wheels to the front pair by the action of the brakes.
5. The forces set up by the motor during acceleration.
6. The so-called "flywheel" effect, or tendency of the rotating parts of the truck to continue rotating.

7. The forces set up by the friction of the brakeshoes on the wheels which are transmitted to the truck structure through the brake hangers.

8. The distortional effect of the horizontal force applied to one corner of the truck by virtue of the thrust of the forward outer wheel against the rail in rounding curves.

To obtain a general idea of the manner in which these forces affect the structure, we may consider the case of a double truck with American Electric Railway Association standard axle *EC*. This axle is designed for a static load of 27,000 lb., making the total weight of the

car including wheels, axles, and passengers approximately 5 tons. The other data concerning the car are as shown in the table below. With the car stationary on a level, straight track the load carried on the center plate of each truck is obviously equal to one-half the car body weight, including the maximum load. The total in the case under consideration is 58,000 lb., or 29,000 lb. per truck. In tracing out the

various parts of the truck structure it is convenient and proper to start from the center plate, which is mounted directly on the bolster, which in turn rests on the elliptic springs. Under the conditions of normal loading, therefore, the truck bolster is in fact a simple beam supported at each end, with a load concentrated at the center. The distance between centers of the elliptic springs will vary with local conditions and the ideas of the designer, but may be assumed for an example to be 60 in. This gives a maximum bending moment of 435,000 in.-lb.

Passing from the bolster, the next link in the truck structure is the elliptic spring. This feature of the truck is one of some particular interest and, as its design is in itself quite a study, it will be treated separately in a later article.

Next to the elliptic spring comes the link suspending the elliptic spring from the transom, and known variously as the "swing link" or "swing motion hanger." This detail, while apparently simple, has been the source of considerable trouble on some trucks due to failure of parts not properly designed. Three general types of hangers are in use. The first consists of a continuous U-shaped strap forged fairly square at the corners; the second is also a continuous strap but it is bent to



I don't know what you mean by bending moment, but that truck will never buckle

DIMENSION AND WEIGHT OF CAR CONSIDERED

Length	50 ft.
Distance between centers of trucks.....	36 ft.
Wheelbase of truck.....	6 ft.
Weight of car body, apparatus and passengers.....	58,000 lb.
Weight of two trucks and motors.....	50,000 lb.
Weight of complete car with passengers.....	108,000 lb.

a radius equal to one-half the distance between the vertical legs, and the third is formed of separate vertical links forged with eyes at the bottom through which passes a pin or axle upon which rests a casting forming a seat for the elliptic spring.

As the swing links are hung from the transom the latter is naturally the next member to be considered. From thence the load is carried to the side frames and so through the coil springs to the equalizer bars and journal boxes, and finally through the wedges and brasses to the journal.

How the Weight Is Shifted on Curves

As it would be mere repetition to consider the strains in all of these parts with the normal loading, I therefore have outlined the mechanical functions of the parts of the combination and we may pass to the second condition, namely the shifting of the weight from one side of the truck to the other due to the action of centrifugal force on curves.

In an article by the writer in a recent issue of the *ELECTRIC RAILWAY JOURNAL*, a discussion is given of the strains in car axles. It was pointed out therein that it is customary to assume that all of the weight has been removed from the inner wheel and concentrated on the outer one through the side thrust set up by the centrifugal force or other sidewise forces.

To find the loading on the truck parts with the car tipped by action of the centrifugal force we may proceed as follows:

The weight of the car body, apparatus and passengers is 58,000 lb. It is this weight which is carried by the

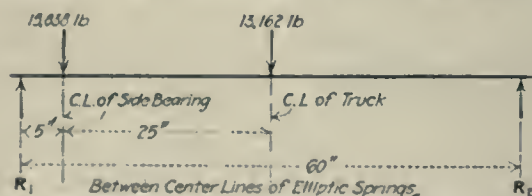


FIG. 1—DIAGRAMMATIC LOADING OF BOLSTER OF TRUCK UNDER CONSIDERATION

truck bolsters. To find the effect of the centrifugal force we must first ascertain the location of the center of gravity of this weight. The distribution of the component parts of this weight is approximately as follows:

Car-body weight,	30,000 lb.....
Apparatus on bottom of body of car, weight	10,000 lb. . .
Passengers, weight	18,000 lb. . .
Total.....	58,000 lb.....

Center of gravity 6 ft. above rail.....	Moment, 180,000 lb.-ft.
Center of gravity 2 1/2 ft. above rail.....	Moment, 25,000 lb.-ft.
Center of gravity 6 ft. above rail.....	Moment, 108,000 lb.-ft.
	313,000 lb.-ft.

Then $313,000 \div 58,000 = 5.4$ ft. That is, the center of gravity of the load carried by the truck bolster is 65 in. above the rail.

It has already been shown in the axle article before referred to that the center of gravity of the total weight on the axle (27,000 lb.) is 60 in. above the rail and the centrifugal force sufficient to throw all the load on the outer rail is 12,713 lb. The proportionate centrifugal force acting on the weight carried by the bolster is, therefore,

$$F = 2 \times 12,713 \times \frac{58,000}{27,000} = 13,654 \text{ lb.}$$

The point of application of this centrifugal force is,

as before stated, 65 in. above the rail. The top of the side bearings is approximately 3 ft. above the rail and the distance between center lines of the bearings is 50 in. Hence the additional load thrown on the outer side bearing is as follows:

$$F = \frac{13,654 \times (65 - 36)}{50 \cdot 2} = 15,838 \text{ lb.}$$

As the load carried by each bolster, with everything normal, is 29,000 lb., concentrated at the center plate, this means that with full centrifugal force acting sufficiently to overturn the car, the load on the bolster would be distributed thus: 15,838 lb. on the outer side bearing and 13,162 lb. on the center plate.

The diagrammatic loading is, therefore, as shown in Fig. 1.

$$\text{Here } R_1 = 6581 + \left(\frac{1}{2} \times 15,838\right) = 21,099 \text{ lb.}$$

$$\text{Bending moment at outer side bearing} = 21,099 \times 5 = 105,495 \text{ in.-lb.}$$

$$\text{Bending moment of truck} = (21,099 \times 30) - (15,838 \times 25) = 237,020 \text{ in.-lb.}$$

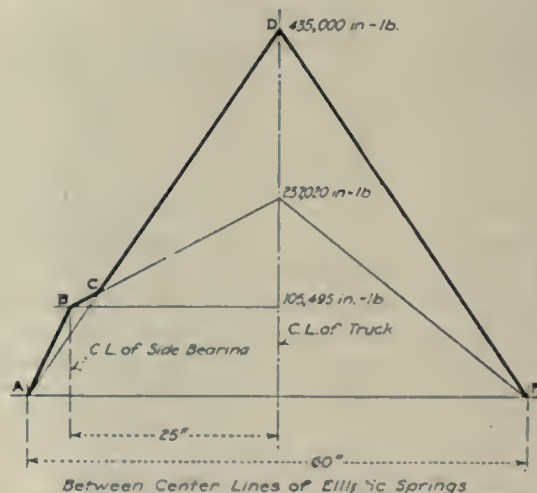


FIG. 2—COMBINED MOMENT DIAGRAM FOR DETERMINING FORCES ACTING UPON TRUCK FRAME

For convenience we may plot a combined moment diagram of the loading with the car standing in its central position and also when tipped by centrifugal force, as shown in Fig. 2. This diagram shows clearly that between the elliptic spring and the side bearing

the loading conditions with the car tipped are controlling, while between side bearings the normal loading gives the maximum bending and the bolster must be designed accordingly. For those who are interested in a further detailed study of the strains in truck bolsters the writer would refer them to a very thorough article by Messrs. Chiles and Kelley, in recent issues of the *Railway Mechanical Engineer*, in which a discussion is given of the various specifications extant, and the stresses imposed by the different loadings required by different designers. This article refers, of course, to bolsters for freight-car trucks, but the reader will find it easy to alter the diagrams and calculations to suit his own passenger-truck conditions.

The authors referred to point out the fact to which the writer of the present article has previously referred, namely, the wide divergence in the conditions of loading and allowable fiber stress set down by different designers.

It will be noted that, in the set of eight factors for study enumerated herein, no mention has been made of any allowance for impact. In the case of a bridge truss this factor is ordinarily taken care of by an allowance such as given in the authoritative specification of Dr. Waddell, which is as follows:

$$I = 400 / (L + 500),$$

in which L is the length in feet of the member, and I is the percentage by which the load is to be increased. Applying this formula to a truck bolster would make I equal to $400/500$, or 80 per cent. Inasmuch, however, as the bolster is carried on springs which absorb a considerable portion of the blows resulting from faulty track conditions, the factor of impact is generally covered by limiting the allowable fiber stress to between 9000 and 10,000 lb. per square inch.

When Is a Rail Joint Well Bonded?

The Conductance of a Bonded Joint Is Quite Different From That of the Bond or Bonds Installed

BY G. H. MCKELWAY

Engineer of Distribution, Brooklyn Rapid Transit System

THE usual answers to the question asked in the title of this article are: "When the conductance of the bonds equals that of the rail," or "when the resistance of the joint and short lengths of the abutting rails equals the resistance of the same length of unbroken rail."

Most men giving one of these two answers will say that the two are really the same and that either could be called 100 per cent bonding.

The two answers, however, are not the same and a little thought will show where they differ. A joint with copper bonds of a cross-section just large enough so that the conductance of the strands or ribbons will exactly equal that of the rail will, if tested without the splice bars, give a result below 100 per cent conductance. This is due to some slack being necessary in the bond wire to allow for the movement of the rails, and to the additional contact resistance between the terminals of the bond and the rail.

However, it should be understood that in many cases there is a great difference between the conductance of the bond or bonds installed at a joint and the conductance of the bonded joint. This is due to the addition of the conductance of the splice bars to that of the bond. The value of the bars as conductors will frequently bring the conductance of the joint considerably higher than that of the joint alone, so that there are many "100 per cent joints" where the conductance of the bonds is much less than that of an equal length of unbroken rail.

SPLICE BARS ARE NOT A SUBSTITUTE FOR BONDS

The value of the splice bars as part of the return circuit is small and no one should get the idea that it will be possible to substitute the joint plates for bonds. This can be done only in cases where rails laid temporarily will be taken up or shifted in a short time, or sometimes on short permanent tracks such as sidings

which are very infrequently used and so short that the total ground drop, though high per foot of track, will not affect operation. There is always the danger of men walking or working on the tracks receiving shocks when tracks are not bonded so that care must be taken in this work. The cost in damages when such an accident occurs would probably pay for bonding the track many times over.

Tests of the conductance of the joints are often made as soon as the bonds are installed, and perhaps a year later similar tests of the same joints are made to determine the deterioration of the bonds. All of the increased drop over the joints, as found in the second test, is charged to the deterioration of the bond contact, while probably most of it is caused by the increase in resistance of the contact between the rails and the plates, due to the loosening of the bolts and working in of rust between the plates and the rails. After the joint resistance has increased above a calculated maximum, equal to the resistance of the joint bonded but without splice bars, it is safe to assume that the bond contact has deteriorated. But before that point has been reached it is unfair to the bond to charge it with all or even a comparatively small proportion of the whole increase. It will be found that the conductance of the path through the plates will fall much faster than the one through the bonds and the latter will seldom be seriously affected until the joint has loosened up to such an extent that the bond or its contact has been damaged by the movement of the rails.

100 PER CENT CONDUCTANCE IS SOMETIMES IMPOSSIBLE

I have occasionally heard of roads having 80-lb. rails, or even heavier, bonded with one or two No. 0000 bonds where the claim is made that the resistance of the rail joints is never allowed to rise above that of 3 ft. or 5 ft. of unbroken rail. At one time a certain city official requested the company with which the writer is connected to bring the conductance of all of its joints on a certain piece of track up to the value of that of 3 ft. of unbroken rail. He quoted the measurements made by one of his engineers as showing that many of the joints were below the resistance of that length of rail. The measurements quoted were made with a Whitney bond tester where the section measured across the joint included 3 ft. of rail, so that he was asking for a minimum of 100 per cent conductance.

Owing to the poor foundation of the track in this case it was impossible to use short bonds at the joints, and the plates had to be spanned by long ones, 37-in. bonds being the shortest that could be used. After two such bonds were installed still longer ones were required to go around the shorter ones. It proved to be absolutely impossible to comply with the request if the bonds alone were relied on, as the two bonds had a cross-section of 422,000 circ.mil, as against a copper equivalent of about 800,000 circ.mil in the rail.

If the efficiency of the bond is to be calculated as it should be without taking into consideration the conductance of the joint plate it will be well to see just what should be expected of a well-installed bond. The standard bond with nearly all companies is of No. 0000 section, but the lengths vary greatly, running from 3½ in. to as many feet or more. Of two bonds of the same cross-section, but of different lengths, a joint bonded with the longer one will show the higher resist-

ance, except with very light rail or very heavy bonds, because the section covered by the bond tester will cover not only the entire length of the short bond but some of the rail as well. The conductance of the additional length of rail will help out that of the bond.

Assume two joints of an 80-lb. rail bonded with No. 0000 bonds, one bond 12 in. long and the other 36 in. long. The path around one joint will consist of the 36-in. bond and, but for the contact resistance, will have a resistance due to 211,000 circ.mil of copper. The length measured at the other joint will be made up of 1 ft. of No. 0000 bond and 2 ft. of 80-lb. rail which has a conductance approximately equivalent to 800,000 circ.mil. The average conductance of the joint bonded with the short bond will therefore be $(800,000) \div 2 + 211,000 \div 3$, or 604,000 circ.mil, as against 211,000 circ.mil with the long bond.

It would appear to be an easy task to determine the

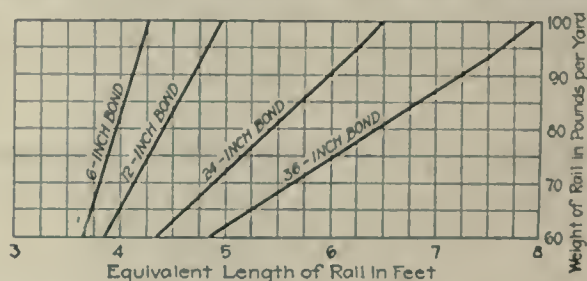
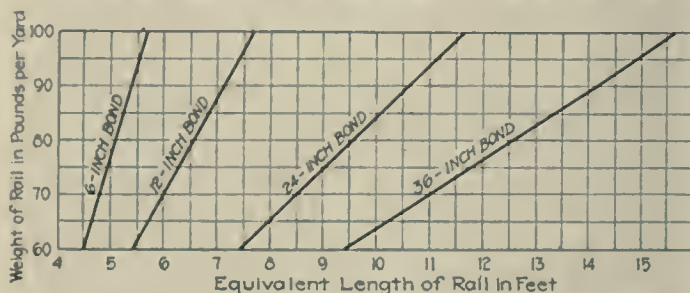
of them, and the resistance of the unbroken rail is so great that it will be found impossible to approach the 3-ft. limit mentioned for good bonding unless considerable help is obtained from the joint plates.

For instance, take an 80-lb. rail bonded with a single No. 0000 bond 12 in. in length, but pulled so tight that the distance between centers of the bond holes is but 12 in. The bond tester will span 3 ft. of rail, or 2 ft. of unbroken rail and 1 ft. of bond. The resistance will then be:

2 ft. of rail	0 000025 ohm
12 in. of bond	0 00005 ohm
Contacts	0 000004 ohm
Total	0 000079 ohm

This is the equivalent of 6.92 ft. of unbroken rail.

The addition of another No. 0000 bond of the same length will not cut this resistance in two as it will affect



GRAPHS SHOWING EQUIVALENT LENGTH OF UNBROKEN RAIL WITH SAME RESISTANCE AS BONDED JOINT
At left, one No. 0000 bond. At right, two No. 0000 bonds per joint with length 3 in. longer than distance between bond holes

resistance of a bond if its unformed length, not the distance between centers of a crimped or otherwise bent bond, is known. While this is a fact so far as the bond itself is concerned there may be a considerable difference between the resistance of the bond between the centers of its terminals and the resistance between these centers on a bonded joint. In the latter case the contact resistance between the rail and the bond terminal has to be taken into account.

There are many opinions as to what this resistance should be. The writer has collected figures from different authorities which show more than thirty different results, the highest being fifty times the lowest, the figures varying from 0.00002 to 0.0000004 ohm per terminal. When considering these differences it should be remembered, however, that they are for more than one size of terminal, the diameters varying from $\frac{1}{8}$ in. to 1 in. Also it is very difficult to record the exact results of tests, as the contact resistance is very low so that a very small error in determining the actual resistance will make a large proportionate variation. Still another cause is the difference in the thickness of rail webs. As the webs of heavy T-rails are much thicker than those of girder rails of the same weight they furnish a much broader path for the current from the rail into the bond or vice versa.

To the writer it seems that a resistance of 0.000004 ohm for the two terminals of a bond is all that can be hoped for in practice, and this is a very low resistance for field work although lower results have been obtained in the laboratory. As this is equivalent to the resistance of only about 1 in. of a No. 0000 bond it can easily be seen that the contact resistance of a carefully compressed bond is almost negligible. However, the difference in resistance between a No. 0000 bond, or even two

only the 12 in. covered by the bond. With two 12-in., No. 0000 bonds the resistance would be:

2 ft. of rail	0 000025 ohm
2 bonds	0 000025 ohm
Contacts	0 000002 ohm
Total	0 000052 ohm

This is the equivalent of 4.16 ft. of unbroken rail.

If a 6-in. bond were used with an 80-lb. rail the resistance of the joint would be:

2 ft. of rail	0 0000312 ohm
Bond	0 000025 ohm
Contact	0 000004 ohm
Total	0 0000602 ohm

This is the equivalent of 4.8 ft. of unbroken rail.

A 6-in. bond is about as short as can be installed with any hope of its remaining unbroken for any length of time, but even if two of them are used with an 80-lb. rail the resistance will be as much as for 3.65 ft. of unbroken rail.

With the long bonds often used around the plates, generally from 36 in. to 42 in. in length, the resistance of the joint is much greater than it would be with short bonds, especially as the bonds are usually from 3 in. to 6 in. longer than the distance between the centers of the bond holes. With such bonds a joint resistance equal to 12 ft. of rail will often be found even when the terminals have been carefully compressed and the bond is in good condition. Thus the futility of giving any one number of feet of rail as the limiting resistance of several types of bonds is apparent.

The accompanying graphs show the equivalent length of unbroken rail that will have the same resistance as the joint if the conductance of the plates is not taken into account and if the bond tester spans 3 ft. of rail.

\$860,000 of Relief—With a String Attached

Public Service Railway Through One-Cent Transfer Charge Receives Less Than One-Quarter of Desired Financial Aid from New Jersey Board—To Obtain Even This It Must File a Zone Plan by January 1

WANTED—\$3,700,000 more revenue to meet increased costs of operation. Granted—\$860,000 by means of a 1-cent transfer charge, upon the express condition that a plan for an equitable zone system shall be submitted to the commission by Jan. 1, 1919. This, in brief, is the story thus far of the struggle of the Public Service Railway, Newark, N. J., for a living rate of fare.

This company in March, 1918, filed a petition with the Board of Public Utility Commissioners of New Jersey, asking for increases from a franchise flat 5-cent fare with free transfers to a 7-cent fare, 2-cent first transfers and 1-cent additional transfers. In a decision just handed down, as briefly noted in the *ELECTRIC RAILWAY JOURNAL* of July 13, the board has affirmed its power to alter franchise rates, but it has reduced the company's financial estimates to what it considers a more "reasonable" basis and bestowed less than one-quarter of the aid desired.

WHAT THE BOARD CONSIDERS AN EMERGENCY

In considering what measure of relief should be granted to meet the admittedly more severe burdens of present-day operating costs, the commission defined an emergency in these words:

An emergency for which a carrier is entitled to relief by a temporary emergency rate exists where, by reason of general conditions not affecting the applicant utility alone, the operating revenues are insufficient to operate and maintain its property and to pay rentals and interest on such of its securities, a default in the payment of which would jeopardize the solvency of the company.

During the war period and in accordance with national and state war policies, while in underwriting normal returns for public utilities we should allow rates sufficient to keep the utility solvent and in good operating condition, we must also continue our declared policy of disallowing rates, in war times, for the purpose of increasing dividends. Stockholders in such corporations must share in the burdens and hardships resulting from financial changes due to the war and cannot expect to escape wholly therefrom.

COMPANY'S ESTIMATES ARE REDUCED

The exact manner in which the commission reduced the estimates upon which the company predicated its plea for an increase of \$3,700,000 in revenues is shown in the comparative table on page 116. The company's estimated appropriation for depreciation reserve, it will be noticed, was \$1,188,149, on the basis of the work carried out in 1916 at the prices now prevailing. This would leave a deficit of \$1,010,631 for 1918, on the estimated revenue at the old rates. For dividends, the company proposed \$1,491,066 on the capital stock outstanding, equal to the amount paid in 1916, and 8 per cent on the \$1,250,000 of additional stock now authorized, or \$100,000, resulting in an estimated deficit of \$2,601,698.

The company also estimated the annual wage increase not included in operating expenses at \$635,714, and the amounts to be paid for franchise taxes and federal

income taxes on the additional revenue at \$257,061, making the total estimated deficit \$3,494,473. After this estimate was prepared additional labor difficulties resulted in an increase in the wage estimate to \$1,085,714. Based on this estimate, the additional revenue required would be \$3,687,412. Accordingly, the franchise taxes and federal income taxes would be increased to approximately \$292,700, making the total estimated deficit \$3,980,112.

The board, however, set up estimates which appeared to it "more reasonable in the light of the operating results of previous years and the first four months of 1918." After raising the revenue and reducing the expense totals, it cut the depreciation estimate from \$1,188,149 to \$800,000 on the ground that this was sufficiently in accord during an emergency with the amounts appropriated to the depreciation reserve and the amounts actually spent for renewals and replacements during the last five years.

Operation on the basis of the board's figures for revenues and expenses, with no provision at all for a return to stockholders, but with the grant of \$1,086,000 more wages to employees, would produce an annual deficit of \$797,000. The commission estimated the additional taxes at \$63,000. Thus the total amount which must be added to the company's revenues in order to enable it to meet its operating expenses, pay bond interest and rentals on leased properties, provide a reasonable appropriation to depreciation reserve and pay increased wages was estimated by the commission at \$860,000.

TRANSFER CHARGE SEEMS MOST EXPEDIENT NOW

The commission decided, therefore, that the company should have approximately \$860,000 of additional revenue, and its choice of method was based on the following reasoning:

Zone Basis

This additional revenue might be secured by increasing the flat 5 cent fare now charged by introducing a zone system of charges whereby the fare should be commensurate with the distance traveled. The zoning system would tend to make the cost of the service more nearly approximate its value to the passenger and would tend to secure the maximum revenue to the operating company at the minimum equitable cost to the passengers carried. It would also tend to make the cost per unit of service more equitable, but it cannot be resorted to to furnish emergency relief on account of the long delay that would ensue before such a system could be developed and equitably applied.

Car-Mile Basis

It may be suggested that the company's revenue for this emergency should be based on a study of the average revenue per car-mile adjusted to present conditions. The board does not consider that this method is logical or feasible. The cars in thickly populated traffic centers are usually crowded to capacity at certain hours and the revenue per car-mile in that portion of the line is high. As the car proceeds and the suburban area is reached or passed, the load becomes very light. If the company were allowed a uniform revenue per car-mile, the total cost per car-mile

(which does not vary largely in percentage) would be assessed on the few remaining passengers and would make the cost of the service so largely exceed its value that the method would fail by reason of such high cost to the passengers.

Transfer Basis

The company estimates that a charge of 1 cent for each transfer issued on a base fare of 5 cents will provide approximately \$850,000 of additional revenue a year, which is substantially the amount of additional revenue required. By making a charge for transfers the additional revenue now required can be promptly secured. At the same time the additional burden will, in general, be carried by the long-haul passengers since as a rule the average total length of ride by passengers who use transfers (including the ride on the cash fare and the ride on the transfer) is longer than the average ride of passengers not using transfers. The transfer charge seems to be the best applicable in the present case, and we have accordingly adopted this method.

ZONE SYSTEM SHOULD BE STUDIED

While the board did not consider the zone system a proper means for emergency relief in the case of the Public Service Railway, it indicated thus its support of this plan for future adoption:

Numerous witnesses produced by the company clearly indicated their opinion that the flat fare system is an inheritance from horse-car days and is in no sense a scientific or proper charge for the service rendered. While the board's power to increase railway fares despite the existence of a municipal ordinance specifying the maximum fare to be charged has been sustained, an important question would arise as to whether we would countenance a horizontal raise of the uniform 5-cent rate without an investigation of the nature and the extent of the service rendered for the fare charged and all the elements involved therein. The charge for the service does not bear any fixed relation to the service. Under the present existing 5-cent uniform rate, some passengers are permitted to be carried a considerably greater distance for the same rate than other passengers. This may unduly discriminate against the short-haul passenger or short-rider, and any horizontal increase in the flat rate would further exaggerate this discrimination.

The witnesses for the company further testified that in the event of a horizontal increase in fares it was reasonably certain that the traffic would diminish by from 15 to 20 per cent, and that this loss of traffic would be the short-haul traffic, for the reason that most of the short-riders in cities would walk rather than use the cars at the increased fare.

If the intimations of the company are correctly interpreted, we can expect with the advent of normal times after the war an application for a readjustment of fares. The matter as to the method of raising revenue and adjusting rates having been so fully discussed in the present application, we are of the opinion that it would not be remiss for us to suggest that the company make a comprehensive study of the question for future use. It is important to the public as well as to the company that the short-haul traffic business should be retained. Such business may be the determining feature which will make possible a general reduction of fares, inasmuch as the best method of development is clearly to retain a low minimum fare. The necessity for modification of the fares being admitted, some method can certainly be devised by a proper study of the company's system. While the system is extensive, covering nearly 1000 miles of track, it is separated and operated in six divisions and is capable of a practical zoning system.

INCREASE IS GRANTED CONDITIONALLY

In allowing the company to institute a charge of 1 cent for transfers on Aug. 1, the board stipulated that the sum of \$1,086,000 must be appropriated toward any wage increase granted by the War Labor Board, since this amount was allowed in the calculation. Moreover, \$800,000 must be reserved for depreciation and not used for any other purpose. Then, since the transfer charge is purely an emergency one, it is said to be effective subject to a written acceptance before July 24 of these conditions:

(a) The company shall promptly file with the board

HOW THE 1918 FINANCIAL ESTIMATES OF THE PUBLIC SERVICE RAILWAY AND THE BOARD OF PUBLIC UTILITY COMMISSIONERS DIFFERED

	Company's Estimate	Board's Estimate
Revenue from transportation	\$18,418,783	\$18,434,000
Revenue from operations other than transportation	465,200	600,000
Total operating revenues	\$18,883,983	\$19,334,000
Operating expenses and taxes (depreciation not included)	13,752,720	13,010,000
Net operating revenue	\$5,131,263	\$6,024,000
Income from other operations	12,000	11,000
Total operating income	\$5,143,263	\$6,035,000
Non-operating income	200,000	220,000
Gross corporate income	\$5,343,263	\$6,255,000
Income deductions (interest on funded debt and rentals)	5,165,745	5,166,000
Balance available for depreciation, dividends and surplus	\$177,518	\$1,089,000
Appropriation to depreciation reserve	1,188,149	800,000
Balance	\$1,010,631	\$289,000
Dividends:		
Capital stock outstanding	\$48,750,000	
Earnings in 1916	\$1,491,066	
Additional stock now authorized	1,250,000	
Earnings at 8 per cent	100,000	1,591,067
Balance for the year	\$2,601,698	\$289,000
Annual amount of wage increases necessary and not included above	† 1,085,714	† 1,086,000
Deficit	\$3,687,412	\$797,000
Amounts to be paid for franchise taxes and federal income taxes if additional revenue required is allowed	292,700	63,000
Total deficit	\$3,980,112	\$860,000

‡ Estimated in proportion to company's original estimate.

† Revised estimate due to increased wage scale (\$635,714 plus \$450,000)

for each calendar month, beginning with June, 1918, as long as this surcharge is added to its schedule of rates, a statement giving the total amount of wages and salaries paid, duly classified by character of service rendered to the company, and the rates per hour, day or period for which the wage or salary is payable, likewise classified, and indicating any change in classification of employees and the wage rates resulting therefrom.

(b) The company shall likewise file with the board for each calendar month, beginning with June, 1918, a complete comparative income statement for 1917 and 1918 of its operations showing revenue and revenue deductions, classified in accordance with the uniform system of accounts for railway utilities (first issue) prescribed by the board, together with mileage, traffic and miscellaneous statistics as required in the annual report to the board.

(c) The board will retain jurisdiction of the emergency or war surcharge, for the purpose of modifying or abrogating it as and if the conditions change.

(d) The company shall file or submit to the board before Jan. 1, 1919, a plan whereby the method of charging at present in force may be revised by an equitable zoning system over its entire territory, proper consideration being given to all of the elements to relate more properly the cost of service to the length of haul and the value of service.

In the course of its remarks the commission alleged that in 1917 the amount which should have been

(Continued on page 115)

The Industry Is Facing More Serious Problems

Mr. Mortimer Doubts That a Fair Return Can Be Earned Under the Flat-Fare System and Urges the Industry to Adopt an "Economically Sound Method" for Stimulating Short-Haul Convenience Travel—Says Public Ownership Should Not Be Fought

A THOROUGH student of fundamental electric railway economics, and at the same time a keen observer of practical conditions and tendencies in the industry—such is James D. Mortimer, president North American Company, New York, N. Y. Mr. Mortimer has heretofore contributed much to the thought of the industry, and when he recently returned from an extensive trip to the Pacific Coast, it seemed to the ELECTRIC RAILWAY JOURNAL that the moment was opportune for comments from him in regard to his impressions of the general utility situation—North, East, South and West.

Mr. Mortimer has frankly responded to the request of this journal, and his opinions will be set forth in this article. He feels that as one travels through the country or reads the press reports of what is occurring in various cities, he cannot do otherwise than conclude that electric railways are facing problems so serious as to threaten in the long run their permanency as a means of transportation. The situation calls for a free discussion of the facts and tendencies. No false ideas of protection of market prices of securities should obscure the facts.

THE EXISTING CONDITIONS ARE THESE

The present conditions in the electric railway industry, as they appear to Mr. Mortimer, may be summarized in this manner:

1. There has been no appreciable expansion of electric railway facilities in the last five years. It has been recognized by investors that the business is one of decreasing returns, subject to great hazard and accordingly uninviting for the investment of capital. Betting on a horse race was comparatively safe com-

(Concluded from page 114)

credited to the depreciation reserve was cut to the extent of more than \$500,000 to permit the payment of dividends. This it characterized as a wholly unjustifiable act and a violation of the paramount duty of the utility. If earnings do not permit a proper reservation for depreciation and also a fair return upon the used and useful property, the remedy, in the board's opinion, is not a reduction of the depreciation allowance but a prompt application to it for relief.

In regard to the rentals paid by the Public Service Railway for leased lines, the board took cognizance of the criticisms made by the opponents of a fare increase by remarking that under long-term leases utilities can secure returns to which they may not be entitled, and the abuse of leases is more marked where the lessor and the lessee are so co-related as to be practically under the same control. The board believes that to secure the complete advantage and benefits of regulation all charges should be carried as far as possible directly by the operating utility.

pared with the stability of electric railway net earnings. There has been no evidence of such a change in the public attitude toward the railways as suggests that private capital will again renew its interest.

2. Jitney competition sprang up, and about the time that it began to wane the industry was hit with the first of the rapidly increasing costs of operation, following the commencement of the war in Europe.

3. Many electric railways have sought the protection of the courts, and others are in imminent danger of receivership. Their earnings have been inadequate to meet interest charges, and they have lacked credit upon which to finance maturing obligations. Little has been done by the public authorities to rehabilitate such credit.

4. In cities where shipbuilding is in progress, the proper transportation of shipyard workers has become impossible. The railways lack, and have no means of procuring, the money with which to extend facilities for this important work. In other cities where war industries are active, cars are more heavily loaded than ever before. In only a few cases have any of the obvious and economical palliatives been applied.

5. The public is generally aware of the increased costs of electric railway service, and it is generally reconciled to the payment of any increased fares which the public authorities may say are fair.

6. But regulation where it exists has broken down. Where it does not exist, the public authorities have generally been afraid to assume the responsibility of allowing the public to pay the railways the increased revenues to which they are entitled. In one instance, where the franchise contract between the railway and the city provides for automatically increasing the fares under specified conditions, the municipal officials have resorted to the courts to prevent or delay the needed and agreed increase in fares. The moral and ethical standards of local administrative bodies have not been chastened by war experience.

7. Regulation first completely demonstrated its failure in Massachusetts. Its failure was forecast in other states when the character of the personnel of the commissions began to decline and when the members began the attempt to right the fancied wrongs of ages gone by. They lack courage; they wish to experiment; they delay action while the deficits multiply.

8. Organized labor has not co-operated to the full practicable extent in assisting railways to adjust their revenues to the increased costs. Organized labor has been fearful that its advocacy of higher revenues might cause public opinion to be directed against it. But labor has been insistent in its demands for higher wages. To the extent that these are necessary to compensate for increases in the necessary cost of living, labor is entirely justified. But labor has a part which it should play, and it has rather consistently declined to play it.

The sanctity of the union has been placed above the solvency of the employer.

9. Many increases in fares have been authorized. On urban lines these have usually taken the form of an increase in the flat fare. The increase in revenue has not been in proportion to the increase in fare. A 20 per cent increase in the rate has usually shown an increase of 8 to 10 per cent in revenue. There has been a relative decrease in the riding habit. The decreases in the number of passengers carried will be found to occur largely, if not entirely, during the non-rush hours. Convenience travel has been reduced. Operators of railways with 6-cent fares, observing the ill effects of the higher unit fare, realize that a new fare scheme must take the place of the time-honored American system.

10. The inadequate revenues on American urban railways have been due, not so much to the fact that the unit fare was too low, but rather to the fact that traffic was being carried too far for the fare paid.

11. The statutes of many states prevent any adjustment of present fares. Until new legislation can be enacted or the federal government exercises its wartime power, the railways will have to continue to operate with losses.

Mr. Mortimer said that he had observed some tendency on the part of urban electric railway operators to propose unit fares higher than 6 cents. If the total required revenues are divided by the number of passengers carried, an 8 or 10-cent fare may be readily justified by the arithmetic operation. But, in his opinion, continuation along this line of reasoning may well prove disastrous to the industry. The suggestion of 7, 8 and 10-cent fares may be a proper method for forcing some other fare system, but its realization in practice is not desirable. The reasons for this he stated as follows:

"A 10-cent fare is almost certain to cause the restoration of automobile carrier competition on hauls of 3 miles or less. Laws or ordinances heretofore passed restricting automobile competition can be readily amended or repealed, and the permanent effectiveness of the present laws and regulations cannot be relied on—it should be guaranteed by sound economics. It would be unwise to adopt any system of fares which would encourage the restoration of competition. If this competition again springs up, it is much more likely to have a longer life.

"Competition would, through the diversion of traffic from the street cars, require still higher fares until the point would be reached where the cars had lost all their business, including even their long-haul traffic. Then the electric railways would have no substantial place in the transportation scheme except as other methods of transportation would overcrowd the streets of most cities. The present tendencies are toward a most unstable and hazardous condition. But the good sense of the electric railway industry will return before that time comes. Its attention needs only to be called to the danger toward which it is heading to cause it to change its course."

The fundamental point, Mr. Mortimer averred, is that urban electric railways need more traffic rather than less. They need this traffic during the non-rush hours, when they have ample equipment and track facilities to care for it. The largest amount of "convenience travel" takes place during these non-rush hours, and it is generally of short haul. A stand-up ride during rush hours cannot as a rule be classed as "convenience travel."

Unit fares involving the payment of more than 5 cents are destructive to convenience short-haul traffic. A 6-cent ride is paid for by the payment of a nickel and 1 cent, or by a dime with 4 cents change. The 4 cents remaining out of a nickel have less value psychologically than 80 per cent of a nickel. In many instances a 6-cent ride accordingly has an apparent cost higher than the actual cost. To walk a short distance then appeals

to many passengers as the saving of 10 cents.

Hence, Mr. Mortimer believes, if a new fare scheme is to be adopted, the industry should try to design it so that the short haul "convenience travel" will be attracted. The more traffic carried during these hours, the more frequent will cars have to be run, and frequent service encourages short haul "convenience travel"; the effect is cumulative. Continuing, he said:

"Some early electric railway executive said that strap-hangers pay dividends." No greater untruth has ever been stated. The remark has been handed down as an economic principle. It was seized as a battle-cry by politicians desirous of securing labor votes, and it has had its effect in promoting lower fares for workmen. But low fares during rush hours tend to promote peak travel. Peak travel increases investment, results in a heavier standing load and contributes to the general dissatisfaction directed against electric railway service.

*"New occasions teach new duties,
Time makes ancient good uncouth;
They must upward still and onward
Who would keep abreast of truth."*

1. Unit fares higher than 6 cents are economically unsound. A new fare scheme for American electric railways is necessary in the interest of preserving their place among the transportation media of the cities. No scheme of fares should be adopted that will reduce short haul and "convenience travel" or that will encourage competition. If the ride for a single fare could be sufficiently shortened, a return to the nickel unit would be desirable.

2. Public ownership of electric railways should not possess the terrors for investors that have heretofore been assigned to it. Much good may come from the advocacy of public ownership. It will at least destroy a popular issue among the politicians, and the electric railway operators need not think, because they advocate it, that public ownership is likely to become any more popular. They should have measured by this time the kind of reaction that their expressed opinions make on the public mind.

3. The electric railway industry is facing a crisis which calls for the exercise of new methods and a departure from the old principles that so far have guided it into the difficult position where it now finds itself. Is this fact generally recognized, or is the industry gradually to be forced into complete financial and economic bankruptcy?

JAMES D. MORTIMER.

If travel were uniformly distributed throughout eighteen hours of each day, a seat could be provided for each passenger, lower fare for the same distance made effective or passengers hauled a longer distance for the same fare, and electric railway service operated with only a small part of the dissatisfaction now so prevalent. Uniform travel is, of course, the limiting case and cannot be achieved in practice, but it is suggestive of tendencies."

NON-RUSH-HOUR TRAFFIC CAN BE PROMOTED BY LOWER UNIT FARES

In Mr. Mortimer's opinion, short-haul "convenience travel" should be promoted by the railways, even to the extent of establishing lower tariffs effective only during the non-rush hours, when working out a new fare scheme as a result of present conditions. The differential in fare between rush and non-rush hours required to cause a substantial flattening of the rush-hour peaks cannot be computed or even estimated, but it is believed that the cost of electric railway service is an item so small in the family budget that any change in price of service would not cause a heavy readjustment in the hour of factory and store closing. The greatest advantage of low tariff fares during non-rush hours would come from the cumulative effects of increased convenience riding and increased service that might be possible thereby.

PUBLIC OWNERSHIP SHOULD NOT BE OPPOSED

Turning to another subject, Mr. Mortimer stated that no electric railway should oppose ownership by the state. In expanding this idea he said:

"State ownership may do violence to our preconceived notions of sound economics and politics. Our troubles in the future may be lessened by inviting it now. Virtual state ownership has been the solution of some of the most difficult situations in Massachusetts, and the early invitation of state or even municipal ownership might have avoided municipal competition in some situations where it is now producing distressing results for the railways that pioneered in the community. It is most unwise for any utility to suggest by implication that it is fearful of the results of municipal or state ownership.

"All talk about the wasteful methods of state operation falls on a majority of deaf ears. If a utility opposes public ownership, it encourages its advocates. Were the utility to advocate state ownership, the socialists and progressives would be deprived of an issue, and an issue is far more useful to the politician than its realization. Many public ownership projects have been forced upon politicians to make good on their representations, and others have come from the reaction of some real or fancied grievance against the existing utility.

"If electric railways are to be publicly owned, however, they should be owned by the state rather than by one or more municipalities. The better and larger electric railways are inter-city, and their problems and economic structure affect portions of the state rather than one community. Unjust discrimination between cities and towns is a patent possibility with a system owned by the largest municipality or divided up among several."

When asked what the development of the near future should be, Mr. Mortimer replied:

"The coming sessions of the various state legislatures will see many bills introduced, designed both to permit and to prevent relief from being granted to electric railways. In this forthcoming legislation it is desirable that all the restrictions heretofore imposed upon the rate of fare being either above or below 5 cents be removed. The requirement that there be a universal fare good for a ride from any part of a municipality to any other part is not in line with the requirements of the times and does not accord with sound economics. Moreover, the opportunities for public ownership of electric railways should be unrestricted except for the requirements of sound finance and accounting methods."

The Slogan for Car Repairs—"Do It Right—Do It Now"

Shop Foremen Should Check Carefully All Work Done Under Them and Make Certain That No Temporary Repairs are Resorted To

BY J. J. SINCLAIR

Assistant Engineer of Car Equipment, New York Municipal Railway Corporation

IN DESIGNING electric railway cars and their equipment the engineers of the operating company and manufacturer devote a great deal of consideration to the materials which enter into the structure of the car or apparatus. They consider the strength and character of the materials and the advisability of their use in connection with the particular functioning of parts. This is followed by a close inspection to insure that the material is used as called for in the specifications.

After the engineer has calculated the various strengths of materials and the inspector has carefully checked the materials used to insure compliance with specifications, the management has every right to expect that as long as the worn parts are properly replaced all danger of breakage of vital parts which may cause serious accidents will be avoided. Parts which are worn, broken, or seriously reduced in capacity should be replaced at the proper time. It should be the aim of every man in charge of the maintenance of this equipment to make repairs at once upon inspection where in his judgment replacement is advisable. Such replacement should never be made with a temporary arrangement. In other words there should be no procrastination in connection with the work of inspection and maintenance of the equipment, as disastrous results are almost sure to follow such procedure.

In order to carry out inspection and maintenance of the equipment with a definite policy for immediate action it is absolutely essential that those having supervision of maintenance and inspection shops spend a considerable portion of their time in looking over the work of the sub-departments, to see that it has been carried out in a thorough manner. When a railway company selects a supervisor for maintenance and inspection work, considerable care is used to see that he is a man of judgment. After the selection has been made, the company relies very largely upon him to see that adequate repairs are made at the proper time. In checking the performance of work he should proceed according to a definite schedule, with a positive system, so that maintainers or overhaulers of equipment will realize that

every care must be taken by them to see that all details are covered before equipment leaves their hands for final check. Then there is no reason why a car, when placed in service will not operate in a satisfactory manner, providing that it has been properly designed for the service which it is called upon to perform.

SERVICE CONDITIONS DETERMINE ELECTRICAL EQUIPMENT SPECIFICATIONS

There are many little points which need constant consideration and immediate attention to keep equipment in the full state of efficiency, some of which may be worth mentioning here.

In order to get normal service as well as emergency service from equipment which has been properly selected it is necessary that the various parts which go to make up the equipment be properly assembled, that all switches be properly lined up, that contact fingers be given proper adjustment, that circuit breakers be properly adjusted so that they will operate as safety valves in cases of overload and that fuses and fuse clips be set so that full rated capacity may be obtained.

When equipment is received it is inspected to make sure that the details have been properly covered by the manufacturer and that the equipment is in proper condition to be placed in service. After a time various parts will become worn. Inspectors should be impressed with the importance of looking ahead and anticipating trouble with these parts by at once removing any that are dangerously worn or broken and making the replacement in a thoroughly workmanlike manner. They must follow the policy of "doing it right and doing it now" rather than wait until a short-circuit from some improperly adjusted finger or temporary repair occurs, with the consequent delay, risk and criticism.

Circuit breakers should have, above everything else, the most scrupulous attention. They must be kept in proper adjustment and set to operate on overloads in accordance with outstanding instructions. Contact tips and boxes, and tripping and latching mechanism must be kept in good condition in order that when the breaker is called upon to function and protect remaining parts from short-circuit it will be ready. It should be considered as part of the safety apparatus of the car.

As an extra precaution against severe short-circuits in cables or other parts of the equipment, cars are equipped with main fuses. These fuses have a definite capacity rating. Fuses of definite capacity are selected for certain classes of equipment to perform a definite service, and it is absolutely essential that the terminal clips be kept in a normal condition and that the wires soldered into the terminals should have good, substantial contact. Often an inspector in looking over a fuse and finding terminals loose or wires improperly connected will make a temporary connection with the idea that the first time the car is brought into the shop the repair will be made permanent. This practice is wrong. A car may give trouble within five minutes after it leaves the shop with vital parts connected in such a temporary manner. That particular fuse would no doubt heat up without proper terminal connections and its capacity would thereby be reduced so that it would "blow" under normal operating conditions, causing delay to service or possibly serious accident.

In purchasing the airbrake equipment for any car, careful consideration is given to the brakeshoe pressure on the wheels, so that when the motorman applies his brakes he will stop the car under the most advantageous conditions and without sliding the wheels. After a motorman has been operating a car with the brakes properly set he can determine very closely what his stopping distance will be with a certain application of the brake.

Unless this equipment is maintained in normal condition, practically the same as when the car is first turned out from the construction shop, this braking distance will vary considerably with the varying condition of the part of the equipment which affect the final brakeshoe pressure. For that reason it is of the utmost importance that inspectors take every precaution to repair at once any leaks in the brake piping, packing leathers of brake cylinders, brake valves, etc. Under no conditions should a car be permitted to leave the shop when leaks are known to exist which will affect the braking power of the equipment. Under no circumstances should a temporary connection be made to permit such car to leave the shop.

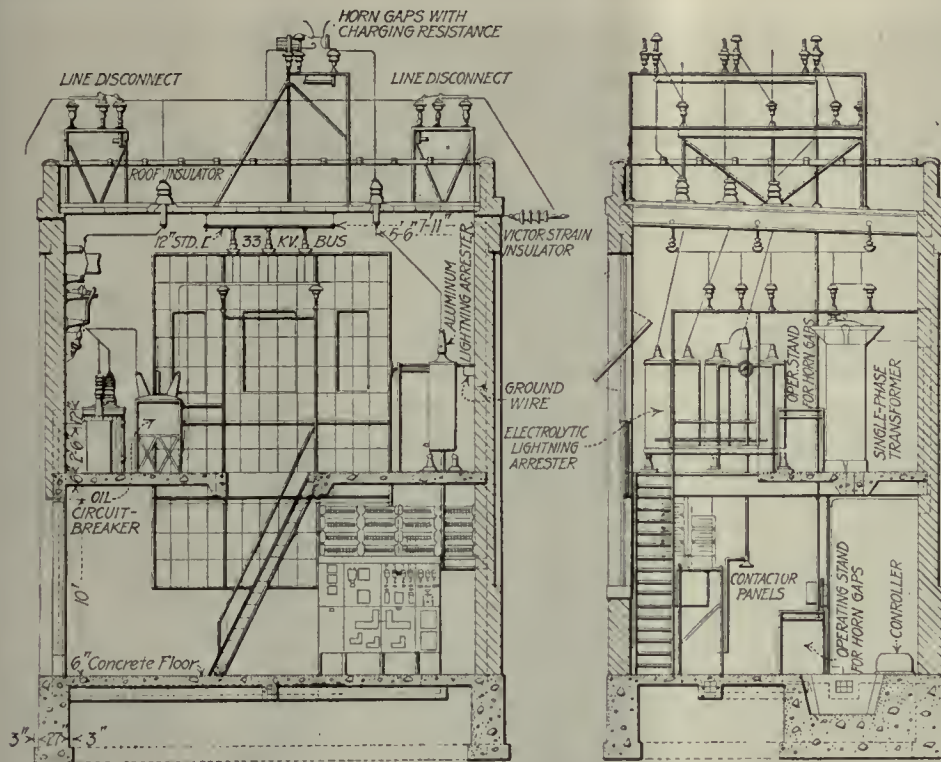
Space Saved by Double-Deck Arrangement in Automatic Substation

Features of Construction and New Equipment Which Reduce Cost and Improve Operation in Iowa Ry. & Light Co.'s New Substation

AN AUTOMATIC substation which the Iowa Railway & Light Company has recently placed in service for the purpose of feeding a section of its interurban railway lines, contains several distinct features in substation design. The building itself is of double-deck construction, and all space is economically utilized. The high tension lines coming to and leaving the station are dead-ended on suspension insulators attached to the building walls instead of the more general plan of ending them on pin-type insulators attached to the racks. The section switches and lightning arrester horn gaps are on the roof. The transformers, lightning arresters and oil switches are on the second floor. The rotary converter and all control equipment, including the handles for operating the section switches and arrester charging equipment, are all on the ground floor, which reduces the amount of stair climbing. The direct-current feeders leave the station underground. The building occupies a space measuring only 25½ ft. x 21½ ft. outside and aside from the economies resulting from the use of shorter copper leads, a considerable saving was effected in its construction over similar buildings.

Other features of the station include the use of a new type of flash-over-proof rotary converter rated at 500-kw. and insulated for 1200 volts, although now operating at only 600 volts. Extra lightning protection was provided by placing aluminum cell lightning arresters on each of the two outgoing 600-volt lines as well as on the direct-current bus. An endeavor was thus made to provide a bypass for the lightning that will be sure to stop it before it enters the control equipment.

Another feature is the method of connecting various sections of the grid resistors by short pieces of bus.



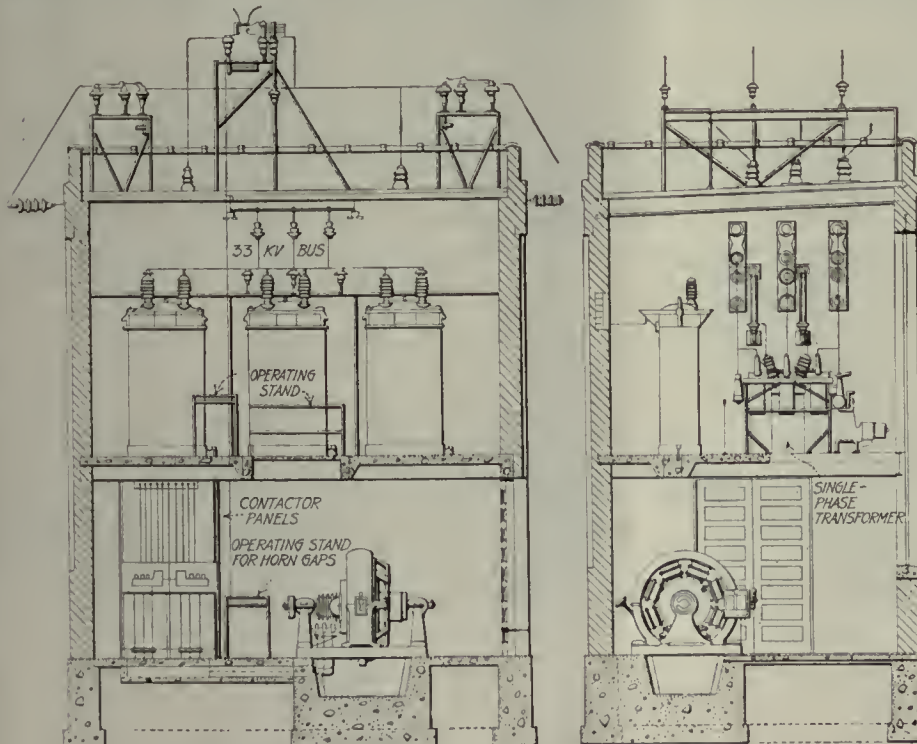
DETAILS OF AUTOMATIC RAILWAY SUBSTATION

copper instead of pieces of cable. This method of construction saved considerable time in the original installation by simplifying the soldering of the different connections. They will also be much easier to maintain than cable connections.

The drum controller which actuates the contactors of the automatic control is of a new type having the spindle horizontal instead of vertical. The method of bringing the operating handles of the section switches

within the building. There is, however, a standard 12-in. I-beam in the ceiling of the top floor located immediately over a grating in the floor of the second story. By attaching a large chain hoist to this I-beam it is possible to lower any transformer to the ground level where it may be removed from the building through large double doors.

The chain hoist is not installed permanently in the substation but is kept at the main power house, where it may be obtained for use at any point on the system. The substation was designed by John M. Drabelle, electrical engineer for the Iowa Railway & Light Company.



SECTIONS THROUGH DOUBLE DECK SUBSTATION

and the lightning arrester charging equipment down to the ground floor level to reduce the amount of stair climbing and to keep employees away from the high-tension equipment is also of interest.

A special feature in the alternating-current control apparatus is the use of a new type of quick-opening relay. Another new piece of equipment which will probably be tried out after the substation has been in operation for a time is a time-limit device designed for controlling the starting of the station under such abnormal conditions as might be imposed upon it by the operation of a work train in the near vicinity of the substation.

From the accompanying drawings of the station it will be observed that apparently no provision has been made for handling the transformers

As rolling stock comes through the shops for overhaul, the Dallas (Tex.) Railway is rewiring the cars and refinishing the interior. Instead of four circuits of five 23-watt lamps, the altered cars have two circuits of 36-watt Mazda lamps running down the center line of the roof. Thus ten sockets are saved, and the energy consumption for lighting is changed from 460 to 360 watts. To improve the diffusion of light, the headlinings are removed, and the ceilings and the carlines painted white. The sockets for the new lamps are set in a white board which runs the length of the car.

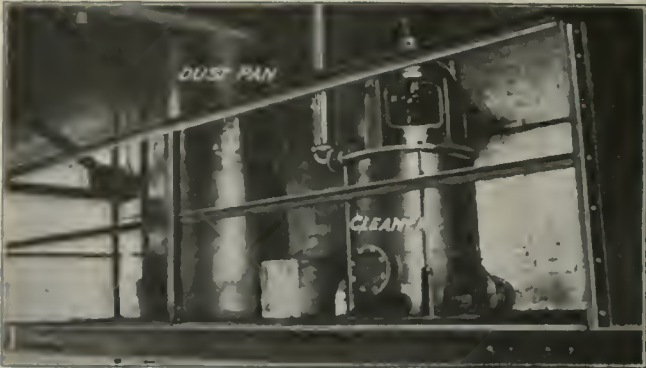


Fig. 1—"Tucc" turbine cleaner mounted near the roof—wash room Cleveland Railway
Fig. 2—Suction pipe line and flexible hose for cleaning car interiors at Cleveland

Fig. 3—Cleaning car interior with vacuum cleaner
Fig. 4—Cleaning motors by vacuum cleaner and air blast
Fig. 5—Vacuum cleaner arrangement in Cleveland Railway motor repair shop

Vacuum Cleaning Equipment for Railway Repair Shops

Vacuum Cleaners Save Labor and Clean Inaccessible Places

Installation of Vacuum Cleaners in the Shops of the Cleveland Railway Make Cleaning More Efficient, Healthful and Pleasant

VACUUM cleaners have been used in the shops of the Cleveland (Ohio) Railway for nearly twenty years and have given great satisfaction both in the saving of labor and in the thoroughness of the work performed. Two "Tucc" turbine cleaners of the stationary type are in use and were furnished by the United Electric Company.

One cleaner is used in the washroom of the paint shop to remove dust and dirt from car interiors prior to painting and varnishing. Seats, window pockets and all spaces inaccessible to a broom or brush are thoroughly cleaned. In this installation the cleaner is mounted at the middle of the shop on a platform near the roof and a suction header is run in both directions to the ends of the building. The layout is shown in Fig. 1 in which the cleaner is on the right. A single centrifugal fan at the top of the cleaner furnishes the suction and is driven by a vertically mounted motor controlled from the floor. The dust tank is shown on the left with the so-called permanent line at the top. Heavy particles of dirt deposit within the cleaner, while the dust and the lighter particles of dirt are carried across to the dust chamber. The exhaust air is carried above the roof of the building when it is discharged. The only wearing parts of the machine are the upper and lower bearings on the motor shaft, and these operate in a constant oil bath.

The permanent line connects with the suction header previously mentioned and from this drop lines extend down to within 7 ft. of the floor. These drop-line pipes, as shown in Fig. 2, have at the lower end a fitting to receive the end of a flexible suction hose. In this way the whole room is served by a minimum length of hose.

The other cleaner is in the motor repair shop, where it is used to remove dust and dirt from motor frames preparatory to overhauling. This machine is of the same general type as that already described and is located in a similar position.

The operation of the motor repair shop cleaner differs somewhat, however, from that of the washroom cleaner. The motor to be cleaned is placed on a grating over a small pit in the shop floor, the pit being connected to the suction end of the cleaner. A hood made of canvas stretched on a light frame is placed over the

motor as shown in Fig. 4, and an air jet is directed against the motor frame through openings in the top and sides of the hood.

The dirt thus loosened is carried to the cleaner through the suction line. The heavy particles deposit in the cleaner and the dust is washed into a settling basin under the shop floor by means of a water spray inclosed in the eliminator shown at the left of the cleaner, Fig. 5. This spray and the motor are controlled from the shop floor. The air exhausts to the roof of the building and the water runs to the sewer. The dust remains in the basin until a sufficient quantity collects to necessitate removal.

Before installing the cleaner the dust and dirt cleaned from the motor frames filled the air and made the work extremely disagreeable. Under the present arrangement there is no dust in the work room and conditions are therefore much more healthful for the men. The same is true when cleaning the car interiors. Aside from the cleanliness and more pleasant and healthful conditions resulting from the installation of the cleaners, it is possible to do the work more thoroughly, in a much shorter time, and with a materially reduced force. In cleaning car interiors and equipment parts installed on the car body a flexible hose is attached to the permanent drop lines. This hose is of sufficient length to reach all parts of the car and is provided with the necessary fittings for attaching to the permanent line and for cleaning the various parts. Accompanying illustrations show the method used in cleaning a car interior and a controller located on the car



FIG. 6—CONTROLLER BEING CLEANED IN POSITION ON PLATFORM

platform. The apparatus is particularly adapted to reaching inaccessible and out-of-the-way places that ordinarily would not receive attention, and is more sanitary than other methods.

Cars to Be Battleship Gray

THE cars of the Virginia Railway & Power Company are to be painted a battleship gray. President Wheelwright states that but from three to four days will be consumed in painting the cars the new color while formerly the painting and revarnishing took as many weeks. Not only will the use of battleship gray paint be more economical, but the efficiency of the system will be increased as cars will not be withdrawn from service for such long periods of time as would otherwise be necessary.

The long-standing tradition that electric railway cars must be painted and varnished much like a piano is not in harmony with these times when efficiency and economy count for more than ever before.

Well Attended Meeting of C. E. R. A.

The Convention Was Held at Cedar Point
and the Discussion Centered on Labor,
Automatic Substations and Publicity

THERE was a good-sized gathering at the annual summer meeting of the Central Electric Railway Association, held at Cedar Point, near Sandusky, Ohio, on July 17-18. Many of the delegates came as usual on through-routed electric cars from different points in the Central States.

At the meeting of the executive committee on Wednesday morning the election was announced to the committee of W. S. Rodger, general traffic manager Detroit United Railway instead of E. J. Burdick of the same company. The Central Electric Railway Accountants' Association also held a short informal meeting at which no papers were presented.

At the regular meeting of the association G. K. Jeffries, Terre Haute, speaking for the joint interline folder committee, reported inadequate support from the companies of the folder now in use, and Secretary Nee-reamer was requested to canvass the membership asking for increased orders for folders or any suggestions which would improve their usefulness.

An address was scheduled after the reports of the committees by H. O. Bentley, general attorney, Western Ohio Railway, Lima, but he was unable to be present. H. A. Nicholl, Union Traction Company of Indiana, then presented an interesting paper on the labor situation. It will be published in abstract next week. The paper was followed by a spirited discussion on the labor problem. The association then passed a resolution of sympathy for former President E. T. Peck, on account of his illness.

SUBSTATION AND PUBLICITY DISCUSSED

In place of the program printed for Thursday, G. Dorcius, General Electric Company, spoke informally on the battles of the Marne and Verdun. He also outlined the history of automatic substation developments and answered numerous questions as to their present status, difficulties, costs, etc. Harry Rimelspach, claim agent, Lake Shore Electric Railway, then spoke on the opportunities offered to the claims departments of the railway companies to improve railway efficiency, closing with a patriotic appeal to electric railways to do all they can to help win the war.

E. R. Kelsey, publicity agent, Toledo Railways & Light Company, gave an enthusiastic talk on railway advertising, showing how the best advertising assets are a company's own employees and that car space campaigns must be continuous, not fitful or for special propaganda. Any live railway, he said, bristles with news which the newspapers are glad to get as such, but advertising in the guise of news is not welcome. Any good salesman can write good copy if he will put himself into it.

The convention entertainment consisted of an informal baseball game between the railway and the supply men in the afternoon, which the latter won. A very popular feature of the entire convention was patriotic music by a mixed quartet under the direction of J. F. Starkey, general passenger agent, Lake Shore Electric Railway. The next meeting of the association will be held at Indianapolis on Thursday, Nov. 21.

LETTER TO THE EDITORS

Factors in Purifying Turbine Lubricating Oil

THE RICHARDSON-PHENIX COMPANY

NEW YORK CITY, July 8, 1918.

To the Editors:

The writer read with much interest the excellent article by Hartley Le H. Smith on "Keeping Power Plant Oil in Good Condition," which appeared in your June 15 issue.

Most engineers believe that an oil filter in connection with a steam-turbine oiling system is simply to remove grit and dirt. If this were the case very few filters would have to be installed in steam-turbine generating stations. However, due to oxidation taking place in the oil and causing the flocculent deposits, of which Mr. Smith's article treats, it is almost imperative in steam-turbine practice carefully to consider the matter of oil purification. Mr. Smith says the ordinary bag type of engine oil filter could not be successfully used for steam-turbine oil purification, and with this statement the writer agrees thoroughly. Mr. Smith suggests that the filter press, which he has seen used in one instance, is admirably suited for this class of work. The writer would like to modify this, however, as he believes that most engineers will appreciate the fact that if oil is forced through any kind of filtering medium under heavy pressure there is the possibility that suspended foreign matter will be carried through with the oil.

For this reason the type of filter made by this company has been proved to be more satisfactory than a pressure type of filter, as the oil is forced through the filtering media by a comparatively low pressure. In fact, it is designed so that the oil practically gravitates with just enough force to carry it through to the clean oil side of the filter.

The five requirements for a suitable oil filter in the modern power plant are: (1) Means for reducing (if necessary) the viscosity of the entering oil. (2) Ample precipitation area. (3) Water removal facilities. (4) Vertical cloth system of dry filtration. (5) Multiple-unit design to facilitate cloth changes without interruption of operation.

As a rule it is not necessary to heat the oil drawn from a steam turbine, but it is always advisable to put coils in a filter, especially if it is of the batch type, so that if the charge of oil has been withdrawn from the turbine oil tank and not immediately used, heat may be applied at some subsequent time when it is desired to begin the process of filtration. The fourth item should be explained by stating that, on account of the evenness of the texture of cloth and the fact that there is no chance of "channeling" (as with the use of waste, Fuller's earth, or bone black, or other loose filtering media), it should be employed and should always be in a vertical position, so that the direction of flow of oil as it is being purified is horizontal. This will prevent "caking" of the foreign matter on the filter cloth, which would be the case if the latter were in a horizontal position. Furthermore, no water should be used for the so-called "washing" of oil.

EDWIN M. MAY.

News of the Electric Railways

TRAFFIC AND TRANSPORTATION

FINANCIAL AND CORPORATE • PERSONAL MENTION • CONSTRUCTION NEWS

Indictments in St. Louis

Disappearance of Franchise Referendum Petition Results in Proceeding Before the Grand Jury

Bruce Cameron, superintendent of transportation of the United Railways, St. Louis, Mo., was indicted on July 8 for second degree burglary and larceny by the grand jury in that city. The indictment is based on the alleged connection of Mr. Cameron with the forcible opening of the safe in which the Citizens' Referendum League had stored petitions for a vote of the people on the United Railways franchise settlement bill, passed on March 29 by the Board of Aldermen. Mr. Cameron promptly gave bail.

The following day Mr. Cameron made a public statement. He said in part:

MR. CAMERON PROCLAIMS HIS INNOCENCE

"I have been indicted upon the evidence of one Jackson, who confesses he committed the deed himself, and of which I am innocent and had no knowledge or connection. I have been in the employ of the United Railways for twenty years, giving nothing but faithful and honorable service. My case will be tried in court, where my innocence will be established. In the meantime I do not wish to cause any embarrassment to the company; therefore, you may consider my resignation at your pleasure."

This statement, although made primarily to the directors of the railway, was given out for general publication. The reference to his resignation from the company had to do with Mr. Cameron's acceptance of an important post with the International Railway, Buffalo, N. Y., which position it is expected he will assume as soon as the charges against him in St. Louis have been removed. The directors of the company accordingly decided to allow the resignation to lie on the table pending the determination of Mr. Cameron's innocence by the trial court. In the meantime the referendum league prepared other petitions and filed them with the proper authorities.

NO PRESUMPTION OF GUILT

Richard McCulloch, president of the company, made a statement in which he said:

"The directors would rather take Mr. Cameron's word than that of Jackson, a man in a shady business and a confessed crook. The indictment of Mr. Cameron, under the circumstances, is only ex-parte presentation and does not afford a presumption of guilt."

In an interview which he gave on July 9 Circuit Attorney McDaniel is reported to have said:

"Early in April, Jackson said Mr. Cameron told him that he must see to it that the preliminary referendum petitions, containing the signatures of 2 per cent of the registered voters, should not be filed. If the filing of these petitions had been prevented, further steps toward a referendum would not have been possible under the charter. May 9 was the last day for filing the 2 per cent petitions."

A renewal of the application for a receiver for the company is referred to on page 128.

Wage Advance in Kansas City

The Kansas City (Mo.) Railways announced to its employees that an increase of 5 cents an hour would be granted coincident with the establishment of the 6-cent fare on July 15. Further increases will be a matter of negotiations under the direction of the War Labor Board.

The company made the promise of the 5-cent increase subject to the granting of increased fare. The union refused the 5-cent offer. Another organization of employees not affiliated with the union asked the company to institute the 5-cent increase pending further negotiations over wages. This request was responded to favorably by the company.

This second organization of employees is known as the "Kansas City Railways Employees' Brotherhood." It consists of about 400 men. There is also an auxiliary of this brotherhood known as the "Kansas City Railways' Women Employees" which includes most of the women who have been recently put to work by the railway company.

The increased wages will apply only to employees on the Missouri division. There are two divisions in Kansas, including about 400 trainmen. These men will receive no increase under the arrangement announced, as the 5-cent advance is due entirely to the increased fare—and the increased fare applies only to Missouri. The fact that the railway is short of employees on the Missouri side suggests that Kansas employees are likely to seek work on the Missouri division and as a result the Kansas service may suffer.

Any negotiations taken up by the War Labor Board will of course apply to both Kansas and Missouri, but the increase to the trainmen in Kansas will doubtless be conditioned upon increased fare similar to the advance made in Missouri.

Wage Increase in Denver

Without Waiting for Increased Fares, Denver Tramway Adds \$240,000 to Yearly Payroll

As a result of delay in action on the petition of May 3 of the Denver (Col.) Tramway to the State Utility Commission for an increase in fares to 6 cents the employees have become anxious concerning the wage increase to which the company had advised them they were entitled. The condition has been augmented by a storm of protest raised by the public against the increase in telephone rates, which has been followed by controversy and delay, by the dispute of the city and the State over the jurisdiction of the Public Utility Commission in rate-making cases and by a misunderstanding of items concerning the attitude of the government in regard to the questions of fare increases and the authority of the War Labor Board.

The trainmen have been encouraged and led on by labor representatives until they believed that an increase in fare would be indefinitely postponed and that before any recognition of their needs would be taken by the War Labor Board it would be necessary for them to unionize. The men believed that such a step would benefit the company in its petition for a fare increase and accordingly without confirming this by meeting with the company officials the wage committee called a meeting of the men for July 17.

As soon as the company received word of this action a statement was issued by F. W. Hild, general manager, in which he said that because of progress made in the fare increase case and confidence in the justness of the cause the following increase would be granted to take effect on or prior to Aug. 15: 6 cents an hour in pay of trainmen and shopmen; 5 cents an hour in scale for employees of the engineering department and for employees of other departments.

This step was taken in the hope that radical action on the part of the employees would be withheld. In spite of the announcement, the meeting was held and a large number of the trainmen organized and affiliated themselves with the Amalgamated Association.

With the increase just granted, the pay of the employees has been advanced 35 per cent since June 1, 1917. The present increase adds to the payroll \$240,000 a year and makes the scale for the trainmen 34 to 40 cents. If the petition for a 6-cent fare is granted it is estimated that the revenue will be increased only \$325,000.

Troubles Pile Up Before Boston Trustees

Quick to Realize Advantage of Full Publicity New Officials Go On Record Regarding Their Problems

The trustees of the Boston (Mass.) Elevated Railway issued statements on July 9 and 12 dealing with problems before them for settlement. The one of July 9 was referred to in the *ELECTRIC RAILWAY JOURNAL* for July 13. It was preliminary in its nature, but it indicated plainly that the trustees would have no option in the future than to make a substantial increase in fares. After reviewing fare applications pending and those granted elsewhere in Massachusetts and in the other states the company said in part:

"The trustees find the elevated road is no exception to the general case throughout the country, and in the analysis that they have and are making of the property they find that for the first five months of this calendar year there has been a deficit below fixed charges of \$233,719, or at the rate of \$560,900 a year.

"The trustees are confronted with a problem that they are compelled by the action of the last Legislature so to adjust the fares as to meet all operating expenses, taxes, rentals, interest on all indebtedness, allowance for depreciation and all other expenditures together with fixed charges on the new preferred stock recently issued as well as \$5 per share on the common stock, this latter amounting to \$1,194,000.

"One cent an hour increase for every employee of the company is equivalent to approximately \$250,000 a year increase in the company's payroll. The total payroll for the company last year was \$9,035,000. It can readily be seen, therefore, that any slight increase in fare or slight modification of tariff will by no means meet the situation, and, in view of the fact that they are compelled by the act to charge such fares as actually to meet the cost of service, they will have no option in the immediate future than to make a very substantial increase in fares.

"The case is serious, however, and requires prompt action. The trustees anticipate continuing their study of the situation with a view to ascertaining, if possible, whether some still more equitable and improved method of increasing the revenue can be devised. Any delay, however, at this time resulting from an extended survey or study of the general fare situation would be decidedly injurious, from the standpoint of carrying out the terms of the act in furnishing as good transportation as possible.

"Estimated increases in cost of operation, including dividends and depreciation for the ensuing year which are absolutely certain, making no allowance whatever for increased cost of material, increased income taxes, increased standard of maintenance, etc., or any provision for the necessary increase in rates of wages of employees, amount to more than \$4,200,000.

"When it is recognized that 1 cent increase of the flat unit of fare, assuming that as many cash passengers ride the ensuing year as rode last year, would amount to \$3,650,000, it can readily be seen that the situation demands prompt and strenuous action.

"The trustees, of course, expect to do everything within their power to reduce operating expenses and to bring about any economies consistent with good service. They are convinced, however, that the opportunity for such economies from the standpoint of large savings is not sufficient for the present, substantially to affect any revised tariff which may be necessary to meet the increased charges. The trustees realize that any delay in properly facing the facts at the outset merely piles up trouble for the future, as all charges under the act commenced July 1, 1918, and the dividends on all stock outstanding, together with fixed charges, rentals, taxes, bond interest, etc., including higher wages, must all be paid by the company securing ample revenue by means of increased fares.

"The trustees fully expect to take definite action on the fare question in the immediate future and sincerely hope that the public as a whole, who indicated their desire for public management by the action of the recent Legislature, will give the trustees every conceivable co-operation and benefit of doubt and show sufficient patience to permit them to work out a most difficult and trying situation."

The statement issued by the trustees on July 12 follows in part:

\$2,000,000 WAGE INCREASE

"The trustees at a meeting held yesterday, in addition to taking up the question of the request of the carmen's union for an increase in their rate of pay, further studied the question of what action it seemed best to take with regard to increasing the fares.

"They find that the gross receipts of the company from all sources for twelve months ending June 30, 1918, were \$19,407,000 and that the operating expenses were \$14,132,668. If the same rate of increase per hour for employees were given as was allowed by the arbitrator in the case of the Springfield, Worcester and other properties, that is, approximately 8 cents an hour, there would be an increase in wage expense of \$2,000,000.

"Summing up, therefore, the trustees are confronted with the necessity of securing gross revenue of at least \$25,560,270 to continue present facilities, which compared with the earnings of last year of \$19,407,000 leaves, without regard to increased cost of material, taxes, fuel, etc., or possible increases in wages in excess of that granted in other cities, approximately \$6,200,000 to be secured.

"The only source of revenue that the trustees have is from car riders and therefore they are compelled by law to charge such fares as will earn a sufficient amount to meet all of the above additional charges.

"There are other items of increases this year over last year which it is impossible to estimate, such as increase in cost of coal, increase in cost of material, unknown increases in taxes, etc.

"In studying the situation the trustees are confronted with the fact that they are compelled to pay either a return or rental on a subway investment of \$43,678,734. So far as they know the general practice in other cities where subways are constructed is for the railway to pay interest on the bonded indebtedness of subways only after having paid all other operating expenses, fixed charges and dividends. Of the total investment in subways on which a return must be earned \$9,084,080 is for the Cambridge subway, which is owned by the company. The remaining investment of \$34,594,654 is for subways owned by the city of Boston. The total amount that the trustees must pay during the next twelve months as a result of the subway construction is therefore \$1,893,826."

Another Subway Link Opened

Temporary operation of the new Lexington Avenue subway, from Forty-second Street and Park Avenue, Manhattan, to 167th Street station on the Jerome Avenue branch, was begun on July 17, at 2 p.m. The arrangements for the opening of this part of the new rapid transit lines in New York City were perfected as a result of almost daily conferences recently between the special committee of the Public Service Commission on operation of the "H" lines, and officials of the Interborough Rapid Transit Company. It will be some weeks, however, before the necessary track arrangements will be completed at Times Square and Grand Central station to permit the through operation of the new Lexington Avenue line in connection with the old subway south of Forty-second Street and the new Seventh Avenue subway in connection with the old subway north of Forty-second Street.

For the present, service in the Lexington Avenue subway will consist of six-car trains using the local tracks. Beyond 167th Street on the Jerome Avenue branch service will be had by elevated trains operating to and from the Sixth and Ninth Avenue elevated lines via the new 162nd Street connection, except that north of Kingsbridge Road station the service will be by shuttle to and from Woodlawn.

The Lexington Avenue subway has been in course of construction for several years. It will cost completed about \$58,800,000, including the equipment furnished by the Interborough Rapid Transit Company. It represents about 6.25 linear miles of subway but adds 23.6 miles of track to the new lines of the dual system in operation.

Labor Board Hearings

At Various Hearings Before Examiners the Companies Present Testimony Regarding Local Conditions

During the last ten days examiners of the War Labor Board have been holding hearings in various localities in order to secure supplementary evidence in the twenty-eight pending electric railway cases. Previously, as noted from time to time in this journal, evidence bearing upon the general labor situation in the industry had been presented before the joint chairmen, William H. Taft and Frank P. Walsh. The purpose of the present hearings before the examiners is primarily to bring out facts showing in what way, if any, the labor conditions in particular cities differ from the general situation.

NEW YORK HEARING ADJOURNED

As mentioned briefly in last week's issue, a hearing was held in New York City on July 12 in reference to the demands of employees in Buffalo, Albany, Schenectady, Rochester, Newark and Trenton. The representatives of the men in general rested their cases upon the brief prepared in the Cleveland and Detroit cases, while the railways made arrangements to prepare briefs on any important local points and submit these to the board by July 26 if possible. On July 22 Messrs. Taft and Walsh have scheduled a hearing for the presentation of general economic testimony by the Public Service Railway, and the board desires to have all the briefs in hand before that time. Representatives of Newark employees expressed the intention of filing a supplementary petition to ask for a 60-cent-an-hour rate.

In the Trenton case, Gaylord Thompson, vice-president and manager of the New Jersey & Pennsylvania Traction Company, explained that the conditions in his company's territory are in no way similar to those in Newark. His company operates through a territory largely agricultural in character, with 75 per cent of the service in Pennsylvania. The operating rate is from 70 to 75 per cent under normal conditions because of the low traffic. Mr. Thompson said that the men demanded an increase of 9 cents to 40 cents, but that a rate of 35 cents offered by the company would exhaust the revenues.

CHICAGO EVIDENCE SUBMITTED

Examiners on July 13 and 15 took evidence in Chicago to be used in determination of wage scales for employees of the Chicago Surface Lines, the Chicago Elevated Railways, the Chicago & West Towns Railway and the Evanston Railway. The proceedings consisted mostly of the introduction of briefs and other exhibits pertaining to the financial condition of the companies. Examiner John A. Henderson said that he understood it is the intention of the board to provide first a living wage for the employees and

after that try to help the companies meet the added expenses.

W. W. Gurley, general counsel of the Chicago Surface Lines, said he would not contest the right of the men to a proper wage. He thought it would be useless, however, to seek the necessary higher rate of fare from the City Council. While he believed the Illinois Public Utilities Commission had the right to regulate fares in Chicago, relief from that source would probably be delayed for a long time if it was found necessary to fix a valuation for the properties. He said it took six months to do this in 1906 when the value was placed at \$50,000,000, and it would undoubtedly take much longer now when the value is about \$155,000,000.

A. L. Gardner, attorney of the Chicago Elevated Railways, made a short statement in explanation of the brief submitted. He contended that every cent per hour increase in wages would cost \$129,562 a year. F. H. McCulloch, attorney for the Evanston Railway, argued that while his company had always paid wages similar to those of the Chicago company there was no justification for this. He made the point that Evanston is a city of homes, with working conditions most agreeable, and that no other company of similar size pays the men so well.

Willard McEwen, attorney for the West Towns company, suggested that the fare level throughout the United States be raised to 10 cents and that all surplus after paying expenses and return on investment be retained by the government. This, he said, would be a proper way of distributing a war tax, as the majority of people patronize car lines. He contended that even a 6 or 7-cent fare might not be sufficient to meet the continual increase in costs.

June 15 was taken up with the testimony of union officials as to the nature of employment of the various classes of employees.

Similar hearings before examiners were held in East St. Louis, Ill., on July 13, in the Galesburg and East St. Louis cases, and in Columbus, Ohio, on July 17, in the Elyria, Cleveland and Columbus cases. Hearings in the Portland, Ore., New Orleans, La., and Jacksonville, Fla., cases will be held in Washington, the exact dates to be announced later.

U. S. Housing Corporation Created

The Department of Labor announces the creation of the United States Housing Corporation, which will, in a large measure, take over the functions that are now being performed by the bureau of industrial housing and transportation. It is expected that this new vehicle will afford more facility in operation than would be possible under the usual governmental agency.

The executive officers of the corporation are: President, Otto M. Eidlitz; vice-president, Joseph D. Leland; treasurer, George G. Box; secretary, B. L. Fenner.

The stock is held on behalf of the government by the Secretary of Labor.

Two Weeks More Needed

Special Counsel Fisher Hopes by Aug. 1 to Complete Draft of New Chicago Merger Ordinance

Eleventh-hour opposition to the proposed ordinance for the merger of the surface and the elevated lines in Chicago and for a subway system in that city almost led to the shelving of the pending plan during the week ended July 13. At a meeting on July 15, however, the members of the local transportation committee decided to continue with their work until a satisfactory report is completed, with the hope of having the City Council approve it before adjournment. Another development at this meeting was the decision to give serious consideration to the trustee plan of Special Counsel Fisher with a view to having "service-at-cost" features worked into the measure in such shape that the companies may find it acceptable.

HOPES OF M. O. CROWD RAISED

Several obstacles were presented without any previous hint of delay to the program, which had been debated for many months by the committee. The municipal ownership element had been silent for some time, but hope for some of their plans was kindled anew with the proposal of Attorney Fisher that the constitutional barrier against such a scheme could be overcome by having the transportation lines taken over by a trustee corporation "not for pecuniary profit" but in reality for municipal operation. This plan was outlined in the *ELECTRIC RAILWAY JOURNAL* of May 4, 1918. The sub-committee thought it impracticable and decided to go ahead with the franchise to the existing companies. They reached the point a few weeks ago where all essentials had been practically agreed to and the final drafting of the measure was being worked out by the lawyers.

DRAFT WORK TO PROCEED

At the committee meeting of July 15, Attorney Fisher said it would require about two weeks to complete the draft of the franchise. The Aldermen told him and the companies' representatives to go ahead with the work and an effort would be made to prevent adjournment of the Council. At the same time Mr. Fisher was asked to present his trustee plan in the form of an ordinance. This he said could be done with little delay. He had overcome one of the points of previous objection by providing that the first board of trustees be selected by the companies and the City Council for a period of eight years—or beyond the date of expiration of the Surface Lines ordinances. He also proposed that the properties be taken over subject to existing liens under a guarantee of present interest rates on bonds and 7 per cent on capital stock. Fares would be raised if necessary to meet these payments, thus giving service at cost. The financial part of the Fisher plan did not appeal to the companies, but Presi-

dent Busby said he would consult the owners of the properties and thought that a solution could be worked out by mutual concessions.

War Bonus in Indianapolis

An increase of 3 cents an hour in the wages of motormen and conductors, in the form of a war bonus, was announced by the Indianapolis Traction & Terminal Company, Indianapolis, Ind., on June 29, the new rate to go into effect on June 30. Robert I. Todd, president of the company, stated that while the company had been losing money under its present rate of fare, and had so far been unable to secure any relief from the city or State authorities, the men were entitled to an advance in wages, as they had been working long hours to maintain the service, which had been difficult owing to the shortage of men. The new wage scale in cents per hour follows:

Less than six months' service.....	25
Six months and less than one year.....	26
One year and less than two years.....	27
Two years and less than three years.....	28
Three years and less than four years.....	29
Four years and less than five years.....	30
Five years and less than six years.....	31
Six years and less than seven years.....	32
Seven years and over.....	33

Three-Cent Wage Increase

The Philadelphia (Pa.) Rapid Transit Company is now experiencing large increases in gross passenger revenues and the management has therefore decided to further anticipate the increased fare and make effective at once the remaining advance in the rate of wage promised to its employees of 3 cents an hour which represents an added charge of more than \$1,000,000 to the annual payroll of the company. The new wage scale for motormen and conductors is as follows: New men, 38 cents; second year, 39 cents; third year, 40 cents; fourth year, 41 cents; fifth year, 42 cents; after five years, 43 cents.

Early in May of this year the employees of the company petitioned the management for an increase in wage of 5 cents per hour, at the same time requesting that application be made to City Councils for an increase in fare to provide sufficient gross revenues to make this large wage advance.

Effective as of May 16 an increase of 2 cents an hour was granted to all employees in anticipation of the increased fare, this wage advance representing an addition of more than \$700,000 to the annual payroll. City Councils on June 20 by resolution referred all procedure in the matter of an increased fare to the Public Service Commission on account of the fact that the new contract between the city and the company now pending before the commission contains provisions for changes in rate of fare, and also in conformity with the ruling of the Attorney General of the State of Pennsylvania that the sole power to regulate fares is now vested in the Public Service Commission.

News Notes

Manchester Wage Matter Settled.—Motormen and conductors employed by the Manchester (N. H.) Street Railway have accepted the offer of the company of an increase in wages of 4½ cents an hour, which was made following a demand by the men for a substantial increase.

Wage Increase in Princeton.—The motormen and conductors of the Princeton Power Company, Princeton, W. Va., have been granted an increase in wages of 5 cents an hour. The operatives on the Princeton-Bluefield interurban lines are advanced from 30 to 35 cents an hour and those on the city cars are to receive an advance of from 25 to 30 cents an hour. The men received an advance of 6 cents an hour six months ago.

Will Oppose Commission Assuming Authority.—The executive board of the Kansas League of Municipalities has adopted a resolution authorizing its officials to oppose assumption of authority over utilities by the State Public Utilities Commission. Richard J. Hopkins, Garden City, Kan., president of the League, will probably take an active part in any controversies wherein the question is the exercise of authority with reference to rates by public service commissions when clauses governing such matters are included in franchises or contracts granted by the municipalities.

City Retaliates by Cutting Power.—Because the Henderson (Ky.) Railway refused to pay street oiling taxes amounting to more than \$3,000 which have accumulated during the last four years, the City Council ordered the current supplied to the railway from the municipal plant discontinued. When asked what steps would be taken by the company in the matter, John C. Worsham, Henderson, attorney for the company, said the city cars and the interurbans would stop running. A formal demand has been made on the city officials to furnish power to operate the cars.

The New Little Rock Scale.—The contract of the Little Rock Railway & Electric Company, Little Rock, Ark., with its trainmen, referred to in the ELECTRIC RAILWAY JOURNAL for June 29, page 1247, was entered into and became effective on May 22. The scale of wages prior to renewal of the contract was from 20 cents to 29 cents an hour. The new scale is from 30 cents to 37 cents an hour. The contract further provides for a ten-hour basic day with time and a half for overtime, and time and a half for the following holidays: July 4, Labor Day, Thanksgiving and Christmas.

Strike in Anniston.—Following the refusal of the Alabama Power Company, Anniston, Ala., to grant an increase in the wage scale of the motormen and conductors, the men ran the cars into the carhouse on July 1 and abandoned their runs. The men asked 25 cents an hour for the first year with an increase of 2 cents an hour up to the sixth year of continuous service. The matter was adjusted by compromise and the men returned to work on July 4. The men will receive 1 cent less than the minimum asked for the first six months. The scale of wages demanded by the men beyond the first six months has been granted by the company.

Increase in Pay on Municipal Line.—The platform men in the employ of the San Francisco (Cal.) Municipal Railway are to have their wages increased 50 cents a day as a result of a decision by the public utilities committee of the Board of Supervisors. This means an increase from \$3.50 to \$4. Car repairers will be increased from \$4 to \$4.50. Fred Boeken, superintendent of the railway, estimates the cost of this increase to the city as \$10,648 a month. The men have agreed to work eight hours and twenty minutes instead of eight hours before charging overtime. This has led to a considerable discussion in San Francisco as to the desirability of inaugurating a 6-cent fare.

Examiners Wanted in Patent Office.—The Patent Office in Washington is in need of men or women who have a scientific education, particularly in higher mathematics, chemistry, physics, and French or German, and who are not subject to the draft for military service. Engineering or teaching experience in addition to the above is valued. The entrance salary is \$1,500. Examinations for the position of assistant examiner are held frequently by the Civil Service Commission at many points in the United States. One is announced for Aug. 21 and 22. Details of the examination may be had upon application to the Civil Service Commission, Washington, D. C., or to the patent office.

Hog Island Line Opened.—At 2 p.m. on July 15 the Philadelphia (Pa.) Railways started operation into the Hog Island Shipyard of the American International Shipbuilding Corporation, Emergency Fleet Corporation. With the carpenters and painters still working on the prepayment gates partial operation was started with an 8-cent fare into South Philadelphia. Up to this time the bulk of the traffic has been handled by the shipbuilding corporation's own shuttle train and by workmen's trains on the Pennsylvania Railroad and the Philadelphia & Reading Railroad. These roads now handle about 28,000 people a day. No publicity was given the opening of the new line, but the cars were crowded. The very efficient police force of the Emergency Fleet Corporation facilitates loading.

Financial and Corporate

Dividend Postponed

Statement to First Preferred Stockholders at Worcester from President Dewey Explains Reasons

The directors of the Worcester (Mass.) Consolidated Street Railway postponed the declaration of the usual June 30 dividend of \$2.50 per share upon the first preferred stock. A statement to the stockholders dated June 27 says:

"This action seemed to the directors advisable because of the recent great increase, amounting to about 24½ per cent, in the wages of the company's employees, resulting from the award of Henry B. Endicott, executive manager of the Public Safety Committee, to whom as arbitrator the decision of the proper increase in wages was submitted by the company and its employees. Payment of the wages on the new scale is effective beginning June 1.

"Application has already been made to the Public Service Commission for approval of an increase in the passenger rates charged by the company. Such an increase seems imperatively necessary to offset the largely increased operating expenses occasioned by the increase in wages. Pending a decision by the commission on this application it was deemed prudent to postpone the declaration of the dividend."

COMPANY HOPEFUL

"Dividends on the first preferred stock are cumulative, and the general public recognition of the need of increased revenue for street railway companies leads the directors to hope that an early and favorable decision may be expected from the Public Service Commission, and that the increase of income will enable the company to pay the postponed dividend."

In 1917 the Worcester Consolidated Street Railway converted 36,000 shares, par \$100, of common into 45,000 shares, par \$80, of first preferred. The New England Investment & Security Company owns the entire common stock, now 33,260 shares, par \$100, and a small amount of first preferred.

The Worcester Railways & Investment Company, which finally held all the stock of the Worcester Consolidated Street Railway, completed liquidation and distribution of its assets on Dec. 31, 1917. The New England Investment & Security Company being on that date the sole stockholder in the Worcester Railways & Investment Company received all the assets including the entire common stock and the small amount of first preferred stock of the Worcester Consolidated Street Railway.

The New England Investment & Security Company for several years

has asked and received the indulgence of the owner of its coupon notes and the note holder has accepted for its coupons a part of their face in cash and a part in contingent obligations of the New England Investment & Security Company. The postponing of the Worcester Consolidated first preferred dividend will affect the payment of interest on its coupon notes, which so far have been held by one party, just to the extent that the dividend payment is delayed.

Committee on Capital Issues

W. F. C. Effects Permanent Organization in Federal Reserve Districts to Pass on Securities

The Capital Issues Committee of the War Finance Corporation has made a permanent plan of organization of the committees in each Federal Reserve district. Each district committee will comprise fifteen members selected from bankers and business men in the district. This reorganization takes the place of the temporary committees that have been serving since February.

The appointments to these committees have been made with regard to geographical and business interests in each district. The chairman of the Federal Reserve Board in each district will act as chairman and the governor of the Federal Reserve Bank will act as vice-chairman. An executive committee of not more than seven members residing conveniently near the Federal Reserve city will meet regularly to pass on applications referred by the Capital Issues Committee in Washington.

Charles S. Hamlin, chairman of the Capital Issues Committee, says:

"The object of the Capital Issues Committee in passing upon all issues of new securities to determine their compatibility with the national interest is to secure the postponement until after the war of the use of capital, materials, and labor in order to give the right of way to the government's financial requirements and to the production of war necessities.

"The district committees will hereafter act definitely upon all applications to issue securities amounting to \$100,000 or less, and in advisory capacity to the main committee at Washington in the matter of applications involving larger amounts. The Capital Issues Committee also has the benefit of the advice of all other departments and branches of the government, including the Food, Fuel, and Railway Administrations, the War Industries Board and other agencies having knowledge of the requirements of essential war industries."

Reorganization Appeal

Petaluma & Santa Rosa Railway Asks California Commission to Approve Its Reorganization Plan

The reorganization committee of the Petaluma & Santa Rosa Railway, Petaluma, Cal., has filed with the Railroad Commission an application for authority to transfer the company's properties to a new corporation; to issue \$1,250,000 of capital stock, 10,000 shares of common stock and 2500 shares of preferred stock, the last with cumulative dividends at 6 per cent, and to issue \$750,000 of 5½ per cent twenty-five-year bonds. The new company wants also to secure these bonds with the First Federal Trust Company, San Francisco, as trustee, with a mortgage by which net earnings ordinarily applicable to dividends on common stock are limited to \$25,000 a year, and that all excess, not needed for the company's business requirements, shall be paid one-half as additional dividends on common stock, one-fourth to a sinking fund to redeem the bonds at not more than 105 per cent, and the remaining quarter to redeem preferred stock at par.

PERSONNEL OF COMMITTEE

The reorganization committee consists of H. P. Goodman, James Otis, L. B. Mackay, Allen I. Kittle, W. H. Hamilton, Russell Lowry, Rudolph Spreckles, George P. McNear and Frank A. Brush, and its petition is accompanied by a printed reorganization agreement dated Oct. 25, 1917. The old company's capital stock is \$1,000,000, of which \$99,410 is outstanding. In 1904 the company executed a mortgage of all its properties to the Mercantile Trust Company, to secure a \$1,000,000 bond issue, of which \$655,000 is outstanding. Of a second mortgage, which is also secured with the Mercantile Trust Company, \$217,000 of the \$250,000 issue is outstanding.

The First Federal Trust Company was substituted as trustee on Feb. 5 last. The company, besides its bond obligations of \$872,000, has deposited in pledge \$80,000 of first mortgage bonds, and \$33,000 of second mortgage bonds to secure a floating indebtedness of \$76,000.

Default has occurred under the second mortgage agreement, and the principal amount is overdue, besides first mortgage covenants unperformed and sundry sinking fund payments unmade.

SALE BY COURT ORDERED

Last February the First Federal Trust Company sued the railway to foreclose the second mortgage, the Mercantile Trust Company intervened, and on May 17 the courts directed the sale of the properties, which sale will occur shortly. The reorganization plan was made in October last, and it is stated that the holders of most of the securities approve it. The application made on July 2 asks for a hearing, and for permission to carry the reorganization agreement into effect.

W. F. C. Makes Advance

Will Furnish Commonwealth Company
\$2,400,000 Out of \$8,047,000 of
Maturing Obligations

The Commonwealth Power, Railway & Light Company, Grand Rapids, Mich., announced on July 16 that the War Finance Corporation had agreed to advance \$2,400,000 toward the retirement of its \$8,047,000 of convertible 5 per cent bonds, provided the company obtained an extension of the balance of the obligation. The bonds fell due on May 1 last. As in case of the \$57,000,000 note issue of the Brooklyn Rapid Transit Company, the funds to be raised by the War Finance Corporation amounted to approximately 30 per cent of the Commonwealth's bonds.

In a letter signed by Anton G. Hodenpyl, president, two plans for carrying out the operation were offered holders of the bonds. Under one plan owners have the opportunity of taking in exchange for their matured bonds a new \$1,000 five-year 7 per cent secured convertible gold bond and \$25 in cash, representing 2½ per cent discount on the new bond, for each \$1,000 old bond. The other proposal calls for a new \$700 five-year 7 per cent convertible gold bond, together with \$17.50 representing a discount of 2½ per cent on the \$700 bond, and \$300 in cash for each \$1,000 of bonds matured. The larger cash payment would represent a payment on principal and to it will be added interest on \$300 at 7 per cent from May 1 to date of payment.

The old bonds of \$500 and \$100 denomination will be entitled to one-half and one-tenth, respectively of the amounts set out in the offers. By reason of the discount the price of the new bonds is equivalent to 97½ and holders will receive a return of 7½ per cent if they keep the bonds to maturity.

The letter asked owners of the old bonds to deposit them under one of the plans as soon as possible. After Aug. 5 deposits will be received only with the consent of the company. When the plan is declared operative, notice will be sent to all owners of deposit receipts who may receive then their cash and new bonds.

First Refunding Issue Proposed

The Syracuse & Suburban Railroad Syracuse, N. Y., has filed with the Public Service Commission for the Second District of New York a petition in which it asks authority to issue a first refunding mortgage to secure an issue of \$1,000,000 of 5 per cent bonds. The petition shows that the company is to use the proceeds, if the commission approves, by applying \$400,000 to the retirement of a like amount of first mortgage bonds due on Aug. 2, 1927, and \$150,000 in first consolidated gold mortgage bonds, due on April 1, 1933. It is also proposed to use \$225,000 to reimburse the treasury for capital expenditures already made and for capital expenditures which must be made in the immediate future and \$225,000 to

be used for such capital expenditures as may be necessary after the expenditure of the first \$225,000. The amounts are to be expended under certain conditions and restrictions named in the mortgage.

A Minimum Income Law

Counsel for New York Commission Says
It's Time for Such a Law for
Public Utilities

In an address made before the National Municipal League, printed in *The Bulletin of the City Club*, ex-Judge William L. Ransom, chief counsel of the Public Service Commission for the First District of New York, said that public utilities were entitled to a living income, and that the public could not afford to have these properties deteriorate to the point where it was impossible adequately to supply the public needs. In answer to the question, "What use ought municipalities to make now of the power placed in their hands by a condition of rising costs and the companies' need for exceeding the rates fixed by franchises?" Mr. Ransom said:

"I believe there is a great opportunity for a firm, just, broad-minded, far-visioned assertion of the public right and interest. The thing the public needs and wants most is good, adequate, satisfactory service. The public cannot afford to force the deterioration and breaking down of the public utility properties, until service goes to pieces, operation becomes unsafe, and the public needs are miserably met. The public utilities are entitled to have a living income; the public interest demands that no less than the interests of the utilities or the investors. The time is at hand when we may have to start an agitation for a 'minimum income law' for our utilities unless public utility service is to go to pieces.

"When the companies agreed to be and remain bound by a 5-cent fare limitation, they gained something of value for it, something which the public gave them in return for such a covenant. If now the companies wish to be relieved from their agreement as to fares, ought not each municipality to impose just, fair, reasonable terms, as conditions of such modification of the contract? It appears to me that the turn of events has placed a wholesome and salutary power in the hands of municipalities—not a power obstinately and short-sightedly to block the rate increases necessary to a continuance of decent service, but a power to procure just and desirable changes in franchise terms, for future public protection.

"Old franchises, granted in reckless disregard of public rights, as to duration, terms and the like, may now be put upon a fair, modern basis. The companies which ask public authorities to modify the fare provisions of franchise contracts will doubtless recognize the propriety of municipal insistence upon other changes in the public interest."

Principal Remains Unpaid

Unable to Take Up Maturing Bonds
Key Route Will Continue to
Pay Interest

In view of the general financial situation and of the financial condition of the San Francisco-Oakland Terminal Railways, Oakland, Cal., this company announced on July 3 that it would be unable to provide for the payment of the issue of Oakland Transit Company first consolidated mortgage 6 per cent gold bonds maturing on July 7. In a circular to the bondholders F. W. Frost, secretary of the company, said:

"The bankers of San Francisco and Oakland who have from time to time considered the formulation of a plan of reorganization, which is complicated by the twelve bond issues upon the company's property, have found it impractical to put forward a plan, with any hope of success, until the franchise situation of the traction division has been readjusted and the earnings of the company have been improved.

"A resettlement franchise is now under consideration by a general committee appointed by the Mayors of the cities of Oakland, Berkeley and Alameda, which committee is understood to have about agreed upon a draft of the proposed franchise.

"The revenues of the company can only be improved by an increase of the rates of fare. Applications for increases have been made to and hearings had before the Railroad Commission. Immediately upon a settlement of the franchise and rate matters, it is the expectation of the directors to undertake a plan of reorganization which, when completed, will be presented to the security holders for action.

"The directors expect to provide for the payment of interest upon the transit bonds referred to pending the completion of the above outlined plans."

Receivership Petition Renewed

The alleged referendum burglary referred to elsewhere in this issue, is used as an argument for the appointment of a receiver for the United Railways, St. Louis, Mo., in an amended petition filed on July 13 in the United States District Court by John W. Seaman, New York, a holder of the company's preferred stock. This receivership suit is a renewal of the one filed by Mr. Seaman on Jan. 7 last, which was dismissed.

The petition charges "improper influencing of State and municipal legislation," and says that "all such expenditures and misconduct are unlawful and harmful to a majority of the stockholders, who had no knowledge of such expenditures."

The fact that the company was compelled to borrow from the United States government \$3,500,000 to pay off bonds maturing on June 1 and the inability of the company to pay the mill tax judgment of more than \$2,000,000 are submitted as proof of insolvency.

Financial News Notes

Would Sell \$3,000,000 of Notes.—The Columbus Railway, Power & Light Company, Columbus, Ohio, has applied to the Ohio Public Utilities Commission for permission to sell \$3,000,000 of two-year 7 per cent notes.

Ohio Road Being Dismantled.—The property of the Suburban Traction Company, owned and operated by the Interurban Railway & Terminal Company, Cincinnati, Ohio, is being dismantled and the rails, etc., are being sold for junk.

Ordered Sold on Aug. 5.—The St. Petersburg & Gulf Railway, St. Petersburg, Fla., has been ordered sold under foreclosure on Aug. 5. Unsecured creditors of the company are said to be organizing to oppose the sale on that date as not likely to prove to their best interest.

Montreal Dividend Deferred.—The directors of Montreal (Que.) Tramways have deferred the payment of the dividend on the common stock payable ordinarily on Aug. 1. The directors state the dividend is deferred until any appeal is heard regarding the increase in fares, to which reference was made in the ELECTRIC RAILWAY JOURNAL for July 13, page 78.

Extra Dividend in Washington, D. C.—The Capital Traction Company, Washington, D. C., has declared an extra dividend of one-half of 1 per cent payable on Aug. 1. The company has been distributing quarterly dividends of 1¼ per cent each, the last payment having been made on July 1. Last December an extra dividend of 1¼ per cent was paid.

Petition to Dismantle Refused.—The Indiana Public Service Commission has entered an order denying the petition of Charles M. Alford to dismantle that part of the Gary Connecting Railways which extends from Gary to Woodville Junction. The commission points out in its order that during war times it is the duty of that body to keep every line of transportation open. It indicated that the road could be made to earn enough to keep it in operation.

Minneapolis Tax Valuation Reduced.—The Minneapolis Street Railway, controlled by the Twin City Rapid Transit Company, Minneapolis, Minn., has had its tax assessment cut from \$8,102,355 to \$7,960,905 for 1918. City Assessor G. L. Fort, commenting on this, the first reduction of the company's taxation valuation ever made, called attention to the fact that in 1917 the company's common stock was quoted at \$96 a share and now it is quoted at about \$40.

International Notes Offered.—E. H. Rollins & Sons, Boston, Mass., are offering collateral trust 6 per cent gold notes for the International Traction Company, Buffalo, N. Y., of 1917, due on Aug. 1, 1920. The authorized issue is \$5,000,000, of which there is outstanding \$2,000,000. The outstanding notes are further secured by a supplemental indenture, made by other interests, pledging with the trustee \$2,667,000 refunding and improvement mortgage 5 per cent gold bonds of 1962, of the International Railway, the entire capital stock of which is owned by the International Traction Company.

Tacoma Property Financing.—Finance Commissioner Shoemaker of Tacoma, Wash., has completed an analysis of the financial report of the Tacoma Railway & Power Company. The analysis is said to show that a reserve fund of \$223,480 in 1910 was converted into a deficit of \$683,870 in 1917. Commissioner Shoemaker alleges that instead of issuing low interest bonds for additions to plant, the company has apparently expected to take care of new facilities from earnings. The property is said to have increased in value from \$2,800,000 to \$6,300,000 with no increase in bonds or stocks, the company bringing this about by borrowing from the Puget Sound Electric Company. Commissioner Shoemaker suggests that the company should be refinanced with a reduction of debt.

B. R. T. Note Plan Operative.—The plan for refunding the \$57,735,000 Brooklyn (N. Y.) Rapid Transit Company note issue into a new three-year, 7 per cent note issue for the same amount has been declared operative. Thirty per cent of the new notes are to be taken up for cash by the War Finance Corporation which permits the company to give holders of the old notes 30 per cent of their holdings in cash and 70 per cent in the new notes. The new notes will be deliverable, with payment in cash of the 30 per cent

balance, at the office of the Central Union Trust Company, on Aug. 15, and holders of the old notes who have not yet deposited them have until Aug. 9 to do so, if they desire to obtain the part cash payment. After that, they will be offered only the new notes.

Suit to Test Responsibility for Taxes.—Fourteen suits were filed against the Philadelphia (Pa.) Rapid Transit Company on July 15 by its underlying companies to recover income and excess profits taxes paid the government a few weeks ago. The suits are filed primarily to test the action of the holding company in refusing to pay these taxes, which, according to counsel for the underlying concerns, is in violation of the contracts entered into by the Philadelphia Rapid Transit Company and its subsidiary companies when the contracts were framed. Ellis Ames Ballard, counsel for the Philadelphia Rapid Transit Company, several weeks ago appeared before the special committee of the House at Washington, urging that in framing the new \$8,000,000 revenue bill it provide that underlying companies be forced to pay their own income and excess-profit taxes.

Another Step in Northern Electric Reorganization.—The Sacramento (Cal.) Northern Railroad has filed with the Railroad Commission for approval a copy of its proposed mortgage securing the payment of \$5,500,000 of 5 per cent twenty-year first mortgage bonds. The Sacramento Northern Railroad was organized in June for the purpose of acquiring the properties formerly owned and operated by the Northern Electric Company, the Northern Electric Railway, the Northern Electric Company—Marysville and Colusa Branch, the Sacramento & Woodland Company, the Sacramento Terminal Company and the affiliated companies. The properties of these companies were sold at foreclosure on May 28, 1918, to Walter D. Mansfield, Oscar J. Cushing and George F. Detrick, acting for the reorganization committee of the Northern Electric Railway. The purchasers of the properties propose now to transfer the sale to the Sacramento Northern Railroad. In its decision of May 25, 1918, the commission indicated the condition under which it would authorize the transfer of the properties. The details of the plan of organization of the successor company were reviewed in the ELECTRIC RAILWAY JOURNAL for June 15, page 1161.

Electric Railway Monthly Earnings

BANGOR RAILWAY & ELECTRIC COMPANY, BANGOR, ME.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., May, '18	\$71,190	\$45,993	\$25,197	\$19,875	\$5,322
1m., May, '17	65,428	39,979	25,449	18,711	6,738
12m., May, '18	902,794	536,073	366,721	235,238	133,483
12m., May, '17	861,583	487,555	374,028	220,318	153,710

CUMBERLAND COUNTY POWER & LIGHT COMPANY, PORTLAND, ME.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., May, '18	\$254,438	\$183,761	\$70,677	\$70,343	\$334
1m., May, '17	236,728	174,718	62,010	67,985	15,975
12m., May, '18	3,107,855	2,159,311	948,544	843,734	104,810
12m., May, '17	2,973,215	1,931,979	1,041,236	812,431	228,805

EAST ST. LOUIS & SUBURBAN COMPANY, EAST ST. LOUIS, ILL.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., May, '18	\$337,079	\$240,069	\$97,010	\$68,084	\$28,926
1m., May, '17	301,645	202,805	98,840	64,870	33,970
12m., May, '18	3,841,814	2,766,053	1,075,761	798,300	277,461
12m., May, '17	3,309,740	2,050,501	1,259,239	765,337	493,902

NEW YORK (N. Y.) RAILWAYS

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., May, '18	\$1,017,842	\$842,434	\$166,803	\$284,481	†\$54,096
1m., May, '17	1,045,801	792,483	253,318	284,393	†26,163
11m., May, '18	10,985,820	8,492,016	2,493,804	3,117,185	†45,041
11m., May, '17	10,435,616	8,340,461	2,095,155	3,104,589	†425,367

*Includes taxes. †Deficit. ‡Includes non-operating income.

Traffic and Transportation

Buffalo Fare Referendum

Six-Cent Fare for That City Will Go Before Voters as Result of Court of Appeals Decision

The New York State Court of Appeals at Albany, N. Y., on July 12 upheld the power of the voters of Buffalo, N. Y., to hold a referendum on the question of whether or not the action taken by the City Council shall be repealed in reference to waiving certain franchise agreements with the International Railway and recommending to the Public Service Commission, Second District, that the company be allowed to charge a 6-cent fare within the city limits. The action of the Court of Appeals affirms the decision of the Appellate Division at Rochester and also the opinion handed down by Justice Herbert P. Bissell in the Supreme Court of Erie County.

REFERENDUM PETITIONS FILED

Referendum petitions asking the City Council to repeal its action in reference to the 6-cent fare agreement with the International Railway have been filed with the City Council. They contain more than 15,000 names, almost four times the number required by law. Under the Commission Charter the Council is now required to reaffirm its previous action or repeal it. If the 6-cent fare agreement with the company is reaffirmed, a special referendum election must be held within ninety days. The referendum is now a certainty and plans are being made by the inspectors of election for taking the vote on the question. Henry W. Killeen, of Penney, Killeen & Nye, of counsel for the company, says that the voters will overwhelmingly defeat the Council's 6-cent fare action and a strike of the company's employees will result unless there is intervention on the part of the federal authorities.

Clifton Reeves, government labor mediator, who has been in Buffalo, making a study of the local traction problem, has gone to Washington to make his report to the War Labor Board. The board has announced that it has no desire to take over the operation of the International Railway as a war necessity, but just what action will be taken by the board is now awaited by the city authorities.

The ultimatum of Mayor George S. Buck to E. G. Connette, president of the International Railway, in which the Mayor threatened to petition the Supreme Court of Erie County for the appointment of a receiver to operate the company, should the company's directors vote to suspend the wage increase of 8-cents an hour, recently granted the platform employees, has apparently had its desired effect. At the meeting of the board of directors of the com-

pany, no action was taken on the matter of withdrawing the wage advance, but President Connette says that the increase will be withdrawn at the next meeting of the board. He says now that the company cannot collect the additional 1-cent from passengers until after the final count on the proposed referendum, which will probably be adverse to the increase. He declares the company is not in a financial condition to assume the additional expense of \$2,000 a day involved in the wage advance.

EMERGENCY RESOLUTION URGED

Efforts are being made by Thomas Penney, vice-president of the railway, and Mr. Killeen, of counsel, to have the Council enact an emergency resolution waiving the franchise agreement with the city and allowing the Public Service Commission to determine what is a just and equitable rate of fare to be charged for the duration of war and six months thereafter. It is the contention of Mr. Killeen that an emergency resolution could not be reviewed by voters at a referendum election. An opinion of the city attorney holds that any action taken by the Council on a franchise matter is subject to a referendum. This opinion has been upheld by the Supreme Court, the Appellate Division and by the New York State Court of Appeals.

Albany Fare Increase Opposed

Flat denial as to the merits of the claims of the United Traction Company for a fare increase in the city of Albany, N. Y., was made at the hearing held recently in the 6-cent fare case before the Public Service Commission.

The three main issues on which Arthur L. Andrews and Judge Woollard, representing the city, based their arguments against the justice of a fare increase follow:

First, it is contended that the figures showing cost of operation as submitted by the company are not properly allocated. It is claimed that these contain figures which really should be increased capital charges.

Second, that in the great and growing deficits the past three years, starting with \$219,000 in 1915 and representing \$244,000 in 1917, are contained expenditures for track repairs which should be apportioned over a longer period and also met by funds which should have been accumulated for this emergency during the company's "years of plenty."

Third, that notwithstanding the fact the application for fare increase applies to the system of the United Traction Company in its entirety, the merits of the case should be tried on the zone

basis and the case of each community be taken and considered separately.

Judge Woollard charged that the company had suffered from poor management since being taken over by the Delaware & Hudson Company in 1907.

Seven Cents for Tacoma

City Council Approves Increase in Fare As Emergency Measure in Aid of Prosecution of War

The City Council of Tacoma, Wash., on July 6 passed the ordinance authorizing the Tacoma Railway & Power Company to collect 7-cent fares within the city limits. It was decided the whole affair was a war emergency and should be put on that basis. The preamble to the ordinance follows:

"An ordinance relating to street car fares and service in aid of the prosecution of the war between the government of the United States and the imperial German government; authorizing the Mayor of the city of Tacoma to enter into a temporary contract on behalf of the city with the companies and prescribing the form of such contract; repealing all ordinances or parts of ordinances in conflict herewith; and declaring an emergency."

In order to avoid legal tangles no ordinances are repealed by number and the whole proceeding is based on the assumption that the people will grasp the conclusion reached by the committee of twenty-five that it is absolutely essential that immediate, ample service be given by the railway and that the city is willing to go the limit in means to secure this service.

The principal features of the new agreement are as follows:

Fare inside city on all lines, 7 cents. Tickets fifteen for \$1, on sale at various stores, shipyards, etc. Universal transfers provided between the Municipal Railway and the lines of the Tacoma Railway & Power Company. One hundred and six cars, the number operated in normal times, to be put back in operation. Cash fare boxes to be taken out to be made over to receive pennies and metal tickets. Old tickets already sold to be honored. Carmen to be paid 50, 55 and 60 cents an hour.

City will get 2 cents out of each transfer collected by the Tacoma Railway & Power Company. City will get 3-2-3 cents on every transfer it takes up coming from the Tacoma Railway & Power Company lines.

Little Rock Fares Before Council

Without discussion the City Council of Little Rock, Ark., on July 8 referred the petition of the Little Rock Railway & Electric Company for an increase of fares to 6 cents to a special committee, composed of the public utilities committee of the Council and three citizens. This action was taken after D. H. Cantrell, president of the company, explained the reason for the company's request, and after the reading of a message by Mayor Taylor recommending that the petition be denied.

Trenton Fare Case Closed

All the Evidence Submitted, Final Argument Heard and Board Now Ready for Briefs

The hearing before the Board of Public Utility Commissioners of New Jersey on the application of the Trenton & Mercer County Traction Corporation for the abolition of strip tickets and the establishment of a 6-cent fare was concluded on July 2. It was agreed that Frank S. Katzenbach, Jr., counsel for the company, and George L. Record, special counsel for the city, should argue the case before the commission on July 19.

VALUATION DISCUSSED

The hearing on July 2 was occupied chiefly with a discussion as to whether the valuation of the physical property for taxing purposes made by State Engineer Louis Focht for the State Board of Taxation in 1915, should be admitted in a rate case. The utilities board decided finally to admit the valuation for what it was worth with the understanding as stated by Mr. Focht that it was not made with a view to representing the investment in the property.

Mr. Katzenbach asked Rankin Johnson, president of the railway company, concerning Peter Witt's plan for a 3-cent fare by which a second fare would be collected for all passengers who pass the center of Trenton, the cars to be operated part of the time on the "pay-as-you-enter" plan and the rest of the time on the "pay-as-you-leave" plan. Mr. Johnson said the chief difficulty in carrying out such a plan was that the resulting revenues were unknown. According to Mr. Johnson the deficit from a year's operation on such a basis might amount to several hundred thousand dollars, the burden of which, under Mr. Witt's plan, would rest entirely on the railway. Mr. Johnson said that the adoption of Mr. Witt's suggestion for an hourly schedule from Trenton to Princeton and to Hamilton Square increasing the company's revenues has resulted in a decrease in gross receipts during the five months it has been in operation.

Mr. Witt again testified on July 1. He advocated the tearing up of another suburban line, that from Lawrenceville to Princeton, in addition to those he has already recommended should be eliminated. He said that a 6-cent fare would produce less revenue in Trenton than the present 4½-cent rate. When asked if he had in mind increased revenues with 6-cent fares put into effect during the past few months in other cities, the witness replied that he had no knowledge of what had been the effect on the revenues with the increased fare in those places.

MR. WITT SUGGESTS ONE-MAN CARS

Mr. Witt recommended the use of one-man cars exclusively during the non-rush hours. He would add a woman conductor to these cars during rush hours. The witness said that by the adoption of one-man cars and the use of

fare boxes, passengers would pay as they enter the car on approaching the center of the city. After passing that corner they would pay as they left the car. By the elimination of transfers and by this system, he estimated that so many more people would ride that the revenue of the company would be increased sufficiently to meet all demands.

Mr. Record introduced at the hearing J. C. Brackenridge, who testified at the hearing in 1915 regarding the elimination of strip tickets, as to the valuation of the company's property.

Counsel for the city and for the corporation completed oral argument on July 9 before the commission. Briefs will be submitted to the board by counsel during the week commencing July 15. The case will then be taken under advisement by the commission.

Mr. Katzenbach argued that there could be no equity in a policy which provides a single valuation for rate making and taxing purposes. He insisted that there was a marked difference between values for taxes and for rate making and declared that all authorities agree that a property may have different values for different purposes. Mr. Katzenbach read a decision of the Wisconsin commission stating that the difference between valuation for taxation and for rate making is entirely proper and logical. He showed that the deficit of the company for the year 1918 at the present rate of fare would exceed \$300,000. With such a deficit, he argued, the company would be powerless to provide improved service. It might be different, he said, if the company were asking for a higher rate of fare than neighboring companies are receiving, but the reverse was the case.

NO OBSTACLE IN WAY OF COMMISSION

In view of the recent decision of the Court of Errors and Appeals, the speaker said, giving the Utilities Commission power to abrogate franchise agreements, there was no obstacle in the way of favorable consideration of the company's application by the board. Referring again to valuations, he said the one made by the J. G. White Engineering Corporation was the only accurate and complete appraisal of the company in existence. He expressed the view that this valuation gives the commission "something to lean upon." None of the other appraisals which the city insisted upon using had been made with the care which characterized the White report. Mr. Katzenbach said that the conditions imposed by the city upon the company through the leases had been carried out by the company. He then outlined the recommendations made by Mr. Witt. He declared the people would prefer to ride comfortably at 6 cents a ride than to travel in Mr. Witt's one-man cars.

Mr. Record argued that the company should reduce its expenses to meet war conditions instead of seeking an increase in fares. He objected to a different valuation for taxing purposes than that presented for rate making. He argued against the decision of the Court of Errors upholding the abrogation of franchise agreements and said that whether the franchise was to stand or fall rested with the utilities board. He said the company bargained for the contract it has with Trenton and now it asked for relief from terms of the grant which it had come to consider onerous, but did not want the perpetual clause of the franchise disturbed. He said that the commission existed to protect the people's interests. He then attacked the leases of the company which he said the board's predecessor had approved notwithstanding the testimony of its chief engineer that the company could never earn money under them.

"In a Hell of a Fix"

According to a conclusion recently reached and announced by the Public Service Commission of the State of Washington, the Spokane & Inland Empire Railroad, Spokane, Wash., "is in a hell of a fix." Commissioners F. R. Spinning and A. A. Lewis assent officially to everything concerning the situation except the form of statement used, but Chairman E. F. Blaine maintains that no other words will aid the public to understand what has happened. Here is the stated condition confronting the Spokane & Inland Empire Railroad and the commission:

The government assumed possession of this railroad on Jan. 1, 1918, and by order No. 28 established rates radically different and in excess of prior rates, and without consultation or approval of the State Commission. After such passenger and freight rates were in effect for periods of twenty and of five days, respectively, the director general relinquished possession of the road and there is no question but that it is now subject to the jurisdiction of the State Public Service Commission.

But what are the rates? Were the said rates in suspension during the period from the date of order No. 28 to July 1, the date the road was turned back by the Director General? If in suspension, under what provision of the State statutes were they suspended? Can it be said that the rates established by order No. 28 are in force? They were federal rates and in no sense State rates. Perhaps the road is without any rates and must, until new rates are established according to the State statutes, operate gratis or not operate at all.

The new Spokane & Inland Empire Railroad rates are fixed on the basic charge of 3 cents a mile with a 10-cent minimum similar to the increase recently filed by the Washington Water Power Company. They were protested on the ground that they imposed a 10-cent charge for less than 1 mile.

Change in Unit Fare

Five-Cent Unit Fare with Shorter Zones Approved for Massachusetts Northeastern Street Railway

The Massachusetts Northeastern Street Railway was authorized in an order dated June 29 by the Public Service Commission of Massachusetts to revise its rates upon the basis of a 5-cent unit fare with shortened zones, in the endeavor to procure additional revenue. The present unit of cash fare upon all lines is 6 cents, but a ticket rate of 5 cents is available for about 3.5 miles from the centers of the cities of Haverhill and Lawrence. Certain workmen's and commutation tickets are sold at reduced rates. The present fare zones range from 1.35 to 6.45 miles in length, with an average of about 4 miles. Including transfer privileges, a maximum ride of 7.65 miles and an average ride of about 5.25 miles are available for a single fare. Lap-over privileges are in use on certain lines.

FARE SECTIONS ACCORDING TO POPULATION

For this system of irregular overlapping zones, the company proposes to substitute a new fare scheme containing certain features of the copper-zone system and certain features of the previously standard fare system used on New England lines. The company proposes a division of its system into fare sections according to population density and other local conditions varying from 1.7 to 3.8 miles in length, and a subdivision of each fare section into two approximately equal zones. The average length of the proposed fare sections is about 2.5 miles and the average fare per mile about 2 cents. The cash fare is to be 5 cents for each fare section, but passengers may ride from any point in the first fare section to any point in the first zone of the adjacent fare section, i. e., over any three consecutive sections, at the rate of 7.5 cents by the use of tickets which are sold in strips of ten for 75 cents.

This arrangement amounts to a reduction in the length of existing zones from an average of 4 miles to about 2.5 miles, a reduction of the unit of fare from 6 to 5 cents, and a graduated increase, instead of the payment of a full additional fare, for rides beyond the first fare section. The plan also involves the abolition of overlapping zones, of certain free transfer privileges, and a reduction of the transfer area where such privileges continue.

The tariff also provides for the sale of twenty-ride workmen's tickets good during certain hours between designated points, at 75 per cent of the regular cash fare, and for certain round-trip excursion rates to Hampton Beach and Canobie Lake Park. On four short beach lines it is proposed to retain the present fare zones and 6-cent unit, as these are operated during the summer only. By the changes planned the company expects \$72,500, or about 9 per cent increase in revenue.

The commission's investigation of revenue and cost conditions on the property indicates that the company might reasonably justify its need for additional revenue of at least \$150,000 a year. The board holds that the company should be allowed a reasonable degree of discretion in regard to the exact fare plan to be adopted, unless the scheme proposed is likely to yield an excessive increase in revenue, to prove discriminatory as between different groups of car riders, or to impose burdens upon the public disproportionate to the revenue results obtained.

In the populous centers of Lawrence, Haverhill, Amesbury and Newburyport the company plans to issue transfers which allow passengers to ride within any two contiguous fare zones for 5 cents. Fare concessions are also made to other points through the issue of workmen's tickets.

At the hearing complaints were made of specific increases between certain points, but few of these were 25 per cent for passengers who choose to avail themselves of the commutation tickets provided by the company. The company agreed to adjust some of these complaints by modifying the length of the fare zones, or by the establishment of special tickets. The commission in general approves the company's tariff plan, but on the summer lines from Plum Island Pavilion to Plum Island Point (1.4-mile existing zone length) and from Salisbury Beach to Black Rocks (existing zone length 1.5 miles), it rules that the 5-cent rate should apply. With other minor changes the company's schedule is adjudged fair and reasonable, and the commission commends the administration of the road and announces its approval of a new tariff modified as outlined.

Fare Statistics Played Up

Doherty News, published by Henry L. Doherty & Company, New York, N. Y., used to advantage recently statistics of fare increases, citing sixty-seven cities in the United States having a population of 100,000 or more and noting that in fifty-seven of these cities street-car fares have been increased, or applications for increases are pending. Thirteen among the sixty-seven are either charging or have been authorized to charge 6-cent fares. In three the zone system is in effect.

In Cleveland, often called the "low-fare city," the highest rate permitted under the present agreement with the city is in effect, and steps are contemplated to amend the agreement to permit of higher fares. In four other cities revenue has been increased by the abolition of reduced-rate tickets.

In thirteen cities a 6-cent fare has been asked for, while in two cities such an application is in immediate pros-

pect. Two other cities are asking for permission to impose an extra charge when a transfer is issued and thirteen cities are asking for increased revenue in other forms.

Skip Stops in Philadelphia

The skip stop was put into effect in Philadelphia on July 15. Only the central section will be immediately affected by the fuel administration's order to the Philadelphia Rapid Transit Company to conserve fuel by reducing the number of car stops. Of 699 regular stops in the district between the Delaware and Schuylkill Rivers, and between Spring Garden Street and South Street, 135 will be abandoned. This is about 19 per cent reduction. In this one district the curtailment of stops will effect a saving of about 1025 tons of coal for essential war industries. The other sections of the city will not be affected until later because of the time required to study traffic conditions.

Wilmington Fares Six Cents

For the present at least the Wilmington & Philadelphia Traction Company will charge a 6-cent fare in Wilmington, Del., instead of the 7-cent fare recently authorized. This was settled on July 3 by agreement of counsel for both sides of the controversy before Chief Justice Pennewill and Judges Rice and Heisel, sitting as a special session of Superior Court, after the judges had decided sufficient notice had not been given to the public regarding the effort to have the Board of Public Utility Commissioners authorize the company to charge 7 cents. The application for a 6-cent fare was made on May 7. A public hearing was held. The application for a 7-cent fare was made on June 3. On the same day an order was entered allowing the 7-cent fare with four tickets for 25 cents. Objection being entered to the 7-cent fare the board replied that it held two public meetings. The court considered the second of these was not properly called. In commenting on the proceedings before the commission the court said in part:

"The court has no doubt that the board have endeavored to do their duty to all parties, but we think it not improper to suggest that their duties might be made easier in the future if they should adopt some plain and simple rules governing their procedure, including a rule providing for a fair hearing on the part of both the public and the public utility."

In its order to the company the court said:

"It is hereby ordered that the order of said Board of Public Utility Commissioners for the city of Wilmington, bearing date of June 5, 1918, for the granting of leave to charge a 7-cent fare, be amended and modified so as to permit the said Wilmington & Philadelphia Traction Company to charge a straight fare of 6 cents."

Appeals to Chamber of Commerce

Theodore P. Shonts, president of the New York (N. Y.) Railways, on July 15 addressed a long letter to the officers and members of the Chamber of Commerce of New York City in which he said that the emergency conditions confronting the company "threaten early bankruptcy" if permission is withheld for an increase to a fare of 6 cents. Mr. Shonts said in part:

"This is purely an emergency action. We do not ask the Board of Estimate to abrogate any of the city's rights or powers, not to alter—except for the temporary emergency—any franchise condition.

"The emergency is extreme. It threatens early bankruptcy. It is a matter of the deepest concern to every civic and business body and to every business man and resident of the city. We believe that when the public knows the facts its judgment will be fair. The interest of the public is continuous and adequate service. Such service cannot be rendered by a utility company unless its income will meet operating expenses, maintenance, depreciation, and a fair return to the owners on the capital invested. Our income is meeting none of these conditions."

Mr. Shonts announces that he will send similar communications to all leading commercial and taxpaying organizations, whose good-will, he observes, is a supremely important factor in all of the transit work.

The Merchants' Association approves a commission hearing on the question of increase in fares, but reserves official sanction for or against the project pending decision by the Public Service Commission. In the bulletin of the association, *Greater New York*, issued July 15, is published a review of the subject, in which the city is asked to suspend street railway contracts to enable the Public Service Commission to consider increased fare applications.

Los Angeles to Zone

The Pacific Electric Railway, Los Angeles, Cal., has made public a statement of the changes it desires in its fares in connection with the application for higher rates referred to in the *ELECTRIC RAILWAY JOURNAL* for June 8, page 1114.

The plan to adjust all interurban fares on a mileage basis is stated briefly as follows:

One-way fares, 3 cents a mile, and round-trip fares, 2½ cents a mile, while no increase in round-trip fare will be more than 20 per cent above the existing round-trip fares.

On commutation tickets, a ten-ride individual ticket, limited to thirty days from date of sale, will be 2 cents a mile; a thirty-ride family ticket, limited to forty days, 1½ cents a mile; and for the daily commuter, a sixty-ride ticket, limited to forty days, as follows: One to 10 miles, 1 cent a mile; 10 miles to 15 miles, 9 mills per mile; 15 miles to 20 miles, 8 mills per mile; more than 20 miles, 7½ mills per mile.

In Los Angeles it is proposed to establish a zone system of fares. The present 5-cent fares will be continued to points on all lines within a radius of approximately 5½ miles of the Hill Street or Main Street stations, as the case may be. Beyond this distance where the present fare is 5 cents the same will be increased to 7 cents. Fares in cities outside Los Angeles will be increased from 5 cents to 6 cents a ride.

Iowa Roads Secure Relief

Iowa interurban railways have practically been granted the right to establish the 3-cent fare basis. A federal order has been issued restraining the state officials and legal department from instituting civil and criminal proceedings against three Iowa interurban railways that are about to increase their fares to 3 cents a mile. The hearing was before Judge Martin J. Wade, of Iowa, Judge Walter Sanborn, of the Eighth Circuit Court of Appeals, and Judge James D. Elliott of the United States District Court in the city of Sioux Falls, S. D.

The three interurbans directly affected are the Cedar Rapids & Marion City Railway, Mason City & Clear Lake Railway and the Clinton, Davenport & Muscatine Railway. The roads were placed under bond to cover refunds in case the 2-cent fare is found not to be confiscatory and that the roads are making a satisfactory income under the 2-cent fare. Until the case is finally disposed of all companies will be required to furnish each ticket purchaser a certificate showing the amount of fare paid.

Increased Fares or Reduced Service

J. J. Stanley, president of the Cleveland (Ohio) Railway, announced on July 8 that Attorney Charles Higley had been selected to represent the company on a board of arbitration to decide whether the rate of fare shall be increased or the service be reduced, following an expression from the city administration to the effect that the fare will not be raised until the Federal War Labor Board has announced its decision on the wage question.

A letter, embodying Mr. Stanley's views, was presented to the City Council on the evening of July 8. It was read and referred to the street railway committee without comment. Mr. Stanley pointed out the position the company will occupy if a large increase in wages, dating from May 1, should be allowed and no funds be accumulated to pay the debt. He argued that the rate of fare should be made large enough at once to take care of the situation.

Another attempt was made recently to induce the company to reduce the rate of dividends to stockholders from 6 per cent to 4 per cent. Mr. Stanley, however, is still unwilling to ask investors to make this sacrifice.

Airs His Troubles in His Cars

William O. Wood, president of the New York & Queens County Railway, Long Island City, N. Y., operating in an important industrial district in which many plants are engaged on government work, in his efforts to obtain men for motormen and men and women for conductors, has posted in each end of every car operated on the system a large placard reading as follows:

"Help Wanted. Factories in this borough engaged in government work to win the war require additional car service.

"To provide for it and at the same time adequately to serve our regular patrons, we must have men and women to operate the cars.

"We need men for motormen, men and women for conductors.

"An allowance will be made for period of instruction, and 30 cents an hour as soon as qualified, with further increases on account of length of service.

"Steady work—permanent employment."

Mr. Wood said:

"I have tried all the ordinary methods of advertising for help, and at last have decided to resort to this scheme. I paid for advertisements in the New York papers, the Brooklyn papers and the Long Island papers, but labor does not seem to realize the opportunity we are offering. We are paying the best wages of any company in the city of New York for beginners. Those engaged in government work are complaining of our service, but we cannot get the men and women to run the cars. I, therefore, concluded that if I placed before all of our riders the advertisement such as is now displayed, it might help us."

The company operates more than 70 miles of city and suburban railway.

Increase for Ohio Interurbans

The Public Utilities Commission of Ohio has just allowed increases in fares to fourteen interurban roads in that State, awards being made according to the showing of financial necessity of each. The range of fares is from 2 to 3 cents a mile, with the majority of the roads being allowed 3 cents.

Commenting on the rate raises, F. W. Coen, president of the Central Electric Railway Association, stated to a representative of the *ELECTRIC RAILWAY JOURNAL* that the result showed a reasonable attitude on the part of the commission and appreciation of the situation confronting the interurban railways.

On the Lake Shore Electric Railway, of which Mr. Coen is vice-president and general manager, the raise is about 0.4 cent, making the average 2.6 cents. This it is estimated will yield an increase of 10 per cent in the income. The plan was to keep about the same differential with interstate steam rates as before.

Transportation News Notes

Six Cents in Battle Creek.—The City Commission of Battle Creek, Mich., has authorized the Michigan United Railways to charge a 6-cent fare in that city.

Increase Authorized for Maryland Company.—The Cumberland & Westernport Electric Railway, Cumberland, Md., has been authorized to increase its rates 20 per cent.

Wants Seven-Cent Fare.—The Southern Public Utilities Company, Charlotte, N. C., has petitioned the Corporation Commission to be allowed to increase its fares to 7 cents, or four tickets for 25 cents.

Skip-Stop Hearing in Milwaukee.—The Railroad Commission of Wisconsin ordered a hearing held on July 17, on the skip-stop plan and also on the near stops. The hearing is in response to the petition from the company.

One Killed and Thirteen Injured.—Two cars on the Stark Electric Railroad, Alliance, Ohio, collided 3 miles east of Alliance on July 4. One man was killed and thirteen other persons were injured. The cars were very badly damaged.

Penalize the Thoughtless.—The International Railway, Buffalo, N. Y., has discontinued the practice of selling tickets on its interurban cars. Hereafter when passengers have failed to buy a ticket before boarding a car, the regular one-way fare will be charged.

Would Increase Suburban Fare.—The Montgomery Light & Traction Company, Montgomery, Ala., has applied to the Public Service Commission of Alabama for an increase from 5 to 10 cents in fare on the Pickett Springs line. A hearing was set for July 18.

Skip Stop for Fort Worth.—G. H. Clifford, general manager of the Northern Texas Traction Company, Fort Worth, Tex., says the skip-stop system will be put in operation on all lines in the city as soon as the plan can be worked out and street markers showing places where street cars will stop can be placed along the streets.

2,000,000 Pennies and 200,000 Metal Tickets.—Nearly 2,000,000 pennies and more than 200,000 metal tickets were secured by the Kansas City (Mo.) Railways for use when the 6-cent fare went into operation on July 15. The decision of the Missouri Commission in this case was reviewed in the *ELECTRIC RAILWAY JOURNAL* for July 6, page 30.

Railway and Bus Conference.—A conference between officials of the Minneapolis Street Railway, controlled by the Twin City Rapid Transit Company, and jitney bus owners is to be arranged by City Aldermen, with a view to formu-

lating a plan for co-ordinate operation of the two modes of transportation, pending the outcome of franchise negotiations.

Macon Fare Hearing Aug. 13.—The hearing on the petition of the Macon Railway & Light Company, Macon, Ga., for an increase from 5 cents to 6 cents in railway fares has been set for Aug. 13. Macon's Mayor and Council have agreed to waive the provision of the franchise contract to a 5-cent fare, leaving the whole matter in the hands of the commission.

Fare Case Rehearing Refused.—The Public Service Commission of Missouri on July 5 overruled the motion of Col. E. M. Harber, city counselor for Kansas City, for a rehearing of the Kansas City Railways fare increase case, in which a 6-cent fare recently was granted by the commission. It is said that the city will now carry the matter to the courts.

Bartlesville Wants Fare Increase.—The Bartlesville (Okla.) Interurban Railway has filed with the State Corporation Commission of Oklahoma application for an increase in fares to be charged between points on its line. The company asks permission to increase local fares in the towns of Bartlesville and Dewey, in which it operates, from 5 cents to 7 cents.

Kaw Line Asks Rate Raise.—The Kansas City, Kaw Valley & Western Railway, Bonner Springs, Kan., filed with the Interstate Commerce Commission on July 13 an application for permission to increase passenger rates to 3 cents a mile, so its rates might be made the same as prescribed for steam lines by the general increase order of the Railroad Administration.

Three Fives Replace Two Sixes.—On July 4 the Claremont Railway & Lighting Company, Claremont, N. H., was allowed to put into effect an increase in passenger fares. Formerly the length of the car line was divided into two zones—6 cents per zone. According to the new schedule, the car line is divided into three zones, and the fare has been made 5 cents in each of the zones.

Conductorettes in Baltimore.—The first women conductors to be employed by the United Railways & Electric Company, Baltimore, Md., went to work on July 10. The women are to fill vacancies only and do not replace men except when the latter leave service, their employment being strictly a war measure with the railway. They will receive the same pay as men conductors.

Service Cut and Rates Advanced.—The Twin City Rapid Transit Company, Minneapolis, Minn., some time ago decided to cut service and advance rates on its Lake Minnetonka suburban lines. Patrons of the line, at a mass meeting at Excelsior, the main suburban point, agreed to the two changes as presented by Horace Lowry, president of the company, and A. W. Warnock, general passenger agent.

Increase in Rates on Calistoga Valley Roads.—The San Francisco, Napa & Calistoga Valley Railway, Napa, Cal., on June 19 was granted permission by the Railroad Commission of California to increase rates. The increase consisted of permission to abolish all round-trip rates and increase on commutation and school children's tickets of 10 per cent. The new rates became effective on July 1.

Car-Bus Connections at Austin.—To serve Camp Mabny, a government school for automobile mechanics, located 5 miles from the center of Austin, Tex., a bus line (Liberty Motor Bus Company) makes connection with a terminus of the Austin Street Railway 1½ miles from camp. The trolley ride is 5 cents cash or 4½ cent ticket; the bus ride, 10 cents. The camp structures are brick buildings and ultimately will have facilities for training more than 3000 men.

Formal Fare Appeal Made.—The Morris County Traction Company, Morristown, N. J., has appealed to the Board of Public Utility Commissioners for an increase in its rates of fare. A flat 6 cents in each of its twelve zones is asked, as against a 5-cent fare generally and tickets at six for a quarter, which are sold solely within the limits of Summit. Notice of the company's intention to file such an application was published in the *ELECTRIC RAILWAY JOURNAL* for July 13, page 80.

Skip Stop in Dallas Aug. 1.—Orders directing the immediate inauguration of skip-stop operation of cars on the lines in Dallas have been issued by Wiley Blair, Federal Fuel Administrator for Texas. M. N. Baker, supervisor of public utilities of Dallas, had been at work on a plan using the skip-stop system. The orders received from Fuel Administrator Blair will serve to speed up this work. It is announced that the plan will likely be put in operation throughout the city by Aug. 1.

Missoula Opposed to Fare Raise.—According to recent reports the city of Missoula, Mont., will resist the increase in fares on the Missoula Street Railway from 5 cents to 7½ cents for rural lines out of Missoula. Application for the increase has been made by the company to the Railroad and Public Service Commission. The city officials contend that the franchise provides for a 5-cent fare within 3 miles of the city limits, and that the company is bound by this provision not to raise its fares.

Six-Cent Fare in Effect in Sioux Falls.—The 6-cent fare voted to the Sioux Falls (S. D.) Traction Company at the election on May 28, noted in the *ELECTRIC RAILWAY JOURNAL* of June 8, page 1113, was put into effect by the company on July 1. The paper tickets have been replaced by metal tokens which are being sold at the rate of five for 30 cents or seventeen for \$1. The operation of one-man safety cars is planned. A special edition of *On the Cars*, the company's paper, was issued to acquaint the public with the changes.

Six Cents in Vancouver.—The city of Vancouver, B. C., has passed a by-law authorizing the British Columbia Electric Railway to charge 6 cents within the city. The City Council of New Westminster and the Council of the municipality of Point Grey have passed resolutions agreeable to similar changes. South Vancouver, whose affairs are in the hands of an administrator, has signified its willingness to allow a 6-cent fare. From Victoria it is reported the City Council is not agreeable to granting the company permission to raise fares unless concessions are made.

Savannah's War Program Approved.—The Savannah (Ga.) Electric Company on July 10 was authorized by the Railroad Commission of Georgia to install the sweeping changes, made in its petition, first to the City Council, then to the Railroad Commission. July 15 was named as the day when the new system was to go into effect. On that date the Whitaker and Liberty Street cars were to be discontinued during the war, and the skip-stop system was made effective. The one-man crew cars on the Battery Park, Fifty-fourth and the Indian Street lines also becomes effective on July 15.

May Appeal Ohio Fare Case.—It is understood that an application will soon be made by the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, for a rehearing in the case in which the Supreme Court of Ohio on June 20 sustained a ruling of the Public Utilities Commission of that State to the effect that it had no authority to increase the rates of fare of interurban roads which have accepted certain rates in consideration of franchises from the cities and counties through which they pass. The decision of the court was referred to in the *ELECTRIC RAILWAY JOURNAL* of June 29, page 1254.

Increase on Atlantic City-Pleasantville Line.—Increases in rates on the Atlantic City and Somers Point division of the Atlantic & Suburban Railway, Pleasantville, N. J., that will advance the revenue of the company \$15,897 a year were allowed by the Public Utility Commission on July 13. The new rates, in the nature of war surcharges, are 12 instead of 10 cents from Atlantic City and Pleasantville, 6 cents instead of 5 cents between Linwood and Somers Point; 6 cents instead of 5 cents between Pleasantville and Absecon; six tickets for 60 cents instead of six for 50 cents between Atlantic City and Pleasantville. There are no changes in the sixty-trip commutation tickets sold by the company.

Louisville Interurban Fares Increased.—On July 1 the Louisville & Interurban Railroad, Louisville, Ky., increased fares on all suburban lines to approximately 2½ cents per mile. Business books will be sold at a rate of approximately 2 cents per mile. Except on milk, cream and livestock, the increase in freight rates will be 25 per cent. At the same time the suburban

rates were advanced the company raised the rates to and from Camp Taylor from 5 cents to 10 cents, 5 cents from the city to the city limits and 5 cents thence to the camp. This particular increase resulted in protests from both soldiers and civilians. After a conference with a committee from the Board of Trade, the company announced that the fare would again be placed at 5 cents, subject perhaps to later revision.

Brooklyn Petition Goes to Committee.—The Board of Estimate of New York City at its meeting on July 12 referred to the committee on franchises, without comment, the petition of the Brooklyn Rapid Transit Company that the matter of increased fares on all the lines of the company be transferred to the Public Service Commission, with power to act. The company wants to increase the rate of fare to 7 cents, and intimated that if consent to the increase could not be obtained it would establish the zone system which was in operation while Brooklyn was an independent municipality. Petitions similar to that of the Brooklyn company, presented by the New York & Long Island Traction Company, the New York & Queens County Railway and the Long Island Electric Railway have also been referred to the same committee.

San Diego Fare Case Stated.—Many misstatements made in regard to the proposal of the San Diego (Cal.) Electric Railway to increase fares, referred to briefly in the *ELECTRIC RAILWAY JOURNAL* of June 15, page 1168, led to the company issuing a special edition of the *San Diego Electric Railway News* on June 1, so as completely and fully to advise the public of the facts. The company explained that it has not made application to raise fares to 6 cents or any other sum. The application is a statement of facts in relation to the affairs of the San Diego Electric Railway and the Point Loma Railroad and a request on behalf of the companies that the Railroad Commission investigate the railways and suggest a remedy to be pursued. The company has reprinted the main text of its application to the Railroad Commission.

May Again Raise Rates.—It is said unofficially that the Springfield (Mass.) Street Railway has found that the elimination of all reduced rate ticket privileges and the increase in fares of the new zone system outside of Springfield will not supply the additional revenue needed by the company and that a new tariff calling for a further fare increase will probably be filed with the Public Service Commission of Massachusetts to go into effect on Sept. 1. A few months ago the company announced that an increase of \$600,000 in the yearly receipts was needed in 1918 but with the new wage scale the estimate is now \$1,000,000. The Springfield rate case was referred to in the *ELECTRIC RAILWAY JOURNAL* for April 6, page 663, and May 4, page 882, while the wage decision was

reviewed in the issue for June 22, page 1202.

Claims Right to Fix Fare.—The Toledo Railways & Light Company, Toledo, Ohio, claims the right to fix its own rate of fare in the absence of valid legislation by Council regulating fare. This claim, despite the assertion that the company must "take what the city offers or get off the streets," was made by the utility in a brief filed to enjoin the city of Toledo permanently from interfering in the collection of the 5-cent fare and a 1-cent charge for a transfer. The company's brief states: "In the absence of any valid legislation by the city regulating the rates of fare in force upon the railway system, it is obvious that the company is at liberty to fix the rates at whatever figure it deems proper, subject, of course, to the right of the city to pass valid legislation fixing a rate of fare which will allow a reasonable rate of return upon the property."

Increased Fares for Peoria.—By virtue of an order entered on July 2 by the Public Utilities Commission of Illinois the Peoria-Railway, controlled by the Illinois Traction System, Peoria, Ill., adopted straight 5-cent fares on July 3. The sale of commutation books and tickets has been abandoned. The commission did not authorize the company to charge a fee of 2 cents for each transfer issued. The order is temporary and until the commission has made a thorough investigation of the earnings of the company. The showing made by the company was deemed sufficient to merit partial relief until the final decision had been announced. The lines of the company in Peoria were not included in the previous order of the commission allowing increases to the company, which decision was reviewed briefly in the issue of the *ELECTRIC RAILWAY JOURNAL* for June 1, page 1072.

Towns Agree to Fare Increase.—The towns of Portland, Westfield and Ripley, N. Y., through which the lines of the Buffalo & Lake Erie Traction Company, Buffalo, N. Y., pass, have consented to an increase in passenger rates and the matter will be presented to the Public Service Commission for the Second District, to determine what is a just and reasonable rate of fare. By the terms of the franchises granted to the railway by these towns and other communities along the company's line between Buffalo and Erie, Pa., the company was limited to charge certain fares. Some time ago the company petitioned the Public Service Commission for permission to increase its interurban fares to 2½ cents a mile, but the franchise agreements blocked action, the commission holding it had no authority to increase fares in towns and cities where the company was bound by franchise restrictions. The company claimed it was a matter of being allowed to charge a higher rate of fare or having to abandon its line west of Fredonia to the New York and Pennsylvania state line.

Personal Mention

J. D. Woodward has been elected president of the Selma (Ala.) Traction Company to succeed Robert Wetheril. Mr. Woodward has also been appointed general manager to succeed A. H. Knean.

B. H. Elliott, formerly superintendent of lines of the Birmingham Railway, Light & Power Company, Birmingham, Ala., has been appointed superintendent of power houses and substations of the company.

E. L. Tait, heretofore assistant engineer of maintenance of way of the British Columbia Electric Railway, Vancouver, B. C., has been appointed engineer of maintenance of way, succeeding A. C. Eddy, who has been granted extended leave of absence for military duty, having joined the U. S. Army.

Arthur H. Young has resigned as director of the American Museum of Safety, New York, to take charge of the employee relations department of the International Harvester Company. Although giving up the actual direction of the museum's work, Mr. Young will continue with that institution as vice-president, in which capacity he has succeeded the late Dr. Frederic R. Hutton.

O. F. Brock has been appointed purchasing agent of the Birmingham Railway, Light & Power Company, Birmingham, Ala., to succeed Charles T. Doerr, who recently resigned to become local purchasing agent at Birmingham for the Air Nitrates Corporation, agents for the United States government in the construction and operation of the nitrate plants at Sheffield, Ala.

A. C. Eddy, maintenance-of-way engineer for the British Columbia Electric Railway, Vancouver, B. C., is now a captain with the Fifty-fifth United States Engineers. He volunteered for service in May, and left on May 31 for Camp Grant, near Chicago. Before leaving, his friends in the company presented him with a purse of more than \$90, the presentation being made by George Kidd, general manager.

L. L. Newman, assistant general manager of the Birmingham Railway, Light & Power Company, Birmingham, Ala., has also been elected vice-president of the company. Mr. Newman was appointed assistant general manager of the company early in 1916, prior to which time he was superintendent of way and structures. Previous to Mr. Newman's connection with the Birmingham Light & Power Company, he was employed in various departments of the Pennsylvania Railroad.

James E. Carnes, formerly contract agent and advertising manager of the Nashville Railway & Light Company,

Nashville, Tenn., has been appointed to the newly-created position of sales and new-business manager. Mr. Carnes' new duties will embrace responsibility for all activities in the sales and lighting department as well as the direction of advertising. Mr. Carnes entered the employ of the company in 1904, and during his fourteen years' connection with the company has served in practically every department.

Lieut. Nugent Fallon, Boston, Mass., is now serving as aviation instructor at the Naval station in Pensacola, Fla. He was formerly superintendent of the South Boston division of the Boston (Mass.) Elevated Railway. He has had an adventurous career as a flier in the service of both England and France at the front. He was promoted from ensign to lieutenant for gallantry in action, on the recommendation of Admiral Sims, commanding the United States Naval forces in European waters.

Thomas F. Hill, of the railway department of the Southern Public Utilities Company in Anderson, N. C., has had his authority extended to cover the meter and contract department, as the result of the resignation of A. E. Holman, who has been superintendent of the latter department for some years. Mr. Hill is one of the oldest men in point of service with the company and its predecessors. He was with the old Anderson Traction Company when that company operated the railway in Anderson and the electric railway from Anderson to Belton.

R. M. Little has been appointed director of the American Museum of Safety, New York, N. Y., to succeed Arthur H. Young. Mr. Little was formerly a trustee of the museum. He is thoroughly versed in work along sociological lines, having served as chairman of the executive committee of the Organized Charities of Chicago and as general secretary of the Philadelphia Society for Organizing Charity. In March, 1917, President Wilson appointed him chairman of the United States Employees Compensation Commission, an office he held until called upon to take up active directorship of the Museum of Safety.

E. B. Wade recently received his commission as captain of the Engineers Corps of the National Army. Captain Wade has been on the staff of Ford, Bacon & Davis, consulting engineers, New York, N. Y., for a number of years. In 1915 he was engineering accountant for the Board of Commissioners of the Port of New Orleans, for the firm, in the construction of cotton warehouses and grain elevators. Since Dec. 1, 1916, Captain Wade has been attached to the New York office, but was

sent to California, where he specialized on valuation work as engineering accountant. He went into the service on May 27 at Camp Merritt, N. J., and is doubtless somewhere in France by this time as his corps is no longer in this country. Captain Wade is thirty-eight years of age. He is well known in electric railway and professional engineering circles.

Hamilton Baluss, who has been general manager of the West Chester, Kennett & Wilmington Electric Railway, Kennett Square, Pa., for the last twelve years, has resigned to accept a position with the United States Ordnance Department as army chief inspector at Philadelphia, Pa. After leaving high school at Detroit, Mich., Mr. Baluss took up the study of law, but abandoned this to enter electric railway work. He held positions with the Detroit, Ypsilanti, Ann Arbor & Jackson Railway, the Grand Rapids, Holland & Chicago Railway and the Chicago & Joliet Electric Railway. He then became general manager of the Marquette City & Presque Isle Railway; then general manager of the Susquehanna Traction Company at Lock Haven, Pa., and then general superintendent of the Cincinnati, Georgetown & Portsmouth Railroad. He resigned from the last-named company to become general manager of the West Chester, Kennett & Wilmington Electric Railway.

William C. Bird, who has been acting as assistant to William T. Cobb, president of the Rockland, Thomaston & Camden Street Railway, Rockland, Me., has been elected general manager. With the presidency Mr. Cobb had combined the duties of general manager, but since he was elected president of the Bath Iron Works, Mr. Cobb has necessarily been absent from Rockland much of the time. In Mr. Cobb's absence Mr. Bird has performed the duties of manager. Mr. Bird was born in Rockland, was graduated from the Massachusetts Institute of Technology in 1912, and during the following year engaged in railroad construction work in Canada. During the next four years his efforts were wholly devoted to railroad construction and operation in the West and South. His last position prior to returning to Rockland was assistant to the chief engineer of the Texas, Oklahoma & Eastern Railroad, with headquarters in Kansas City. On Feb. 1, 1917, he became assistant to President Cobb of the Rockland, Thomaston & Camden Street Railway, which does power business.

Obituary

Wesley Meeteer, president of the Wallace Supplies Manufacturing Company, Chicago and New York, died at his home in East Orange, N. J., on July 10. Interment took place in Wilmington, Del., on July 13.

Construction News

Construction News Notes are classified under each heading alphabetically by States. An asterisk (*) indicates a project not previously reported.

Recent Incorporations

***Emergency Fleet Railroad Company, Camden, N. J.**—Incorporated to construct a line from the shipyard plants in Camden to connect with the Public Service Railway. Capital stock, \$250,000. Incorporators: Norman Grey, G. T. Seeley, assistant director of the division of passenger transportation of the Emergency Fleet Corporation, and G. D. Connelly.

***American Power & Railway Company, Charlotte, N. C.**—Incorporated to operate electric and steam railroads, also to generate and transmit electric power. Capital stock, \$100,000. Incorporators: H. M. Victor, C. B. Eryant and D. D. Trawick.

Franchises

East St. Louis, Ill.—The East St. Louis, Columbia & Waterloo Railroad has been granted a twenty-year franchise by the City Council of East St. Louis to use certain local streets of the city, with the provision that 2 per cent of the gross receipts taken in the city is to go to the city treasury of East St. Louis. The cars of the company are now operated over tracks owned by the East St. Louis & Suburban Railway. Regular passenger cars are operated between Waterloo and East St. Louis.

Track and Roadway

Valdosta (Ga.) Street Railway.—Work will soon be begun by this company on the construction of a ½-mile extension to the fair grounds.

Chicago, Milwaukee & St. Paul Railroad, Chicago, Ill.—A contract has recently been awarded by the Chicago, Milwaukee & St. Paul Railroad to the Union Switch & Signal Company, Swissvale, Pa., for the material for the installation of an automatic block signaling system on its line now being electrified, from Othello to Black River Junction, a distance of 184 miles, where it divides and extends to Tacoma, Wash., 27 miles, and to Seattle, Wash., 9 miles, a total distance of 220 miles. The railroad company's field forces will do the construction work.

Lincoln (Ill.) Municipal Railway.—A report from the Lincoln Municipal Railway states that the construction of 1 mile of new track is contemplated.

Lewiston, Augusta & Waterville Street Railway, Lewiston, Maine.—The Lewiston, Augusta & Waterville Street Railway has filed with the Public Utilities Commission of Maine for its approval a petition which evidences the first step toward the large improvement of its service promised at the recent hearings in Lewiston when it asked for increased rates to better its financial standing and enable it to make contracts on reasonable terms. It contemplates a complete rehabilitation of the service between Lewiston and Bath and improvements to other lines. The company has completed negotiations with the United States Shipping Board Emergency Fleet Corporation whereby the latter, in order to secure better car service in Bath and between Bath and Brunswick, agrees to assist to the extent of \$165,000 by providing new cars, transformers, transmission lines and other equipment.

Interborough Rapid Transit Company, New York, N. Y.—Operation has been begun by the Interborough Rapid Transit Company on the Lexington Avenue extension of the subway from Forty-second Street to 167th Street on the Jerome Avenue branch. From there elevated and shuttle service will be provided to the end of the line.

Sapulpa & Interurban Railway, Sapulpa, Okla.—This company will eliminate some curves on the Sapulpa-Kiefer line.

Philadelphia, Pa.—By agreement reached on July 11 in the negotiations for the suspension or annulment of the subway contract for the period of the war, the Keystone State Construction Company will not extend its present operations, but will confine its activities to the completion of the actual work within the limits where the streets have been opened. This status will continue until the City Councils reconvene and either approve or reject the terms of settlement.

Philadelphia (Pa.) Railways.—Operation was begun on July 15 by the Philadelphia Railways into the Hog Island Shipyard of the American International Shipbuilding Corporation, Emergency Fleet Corporation. Up to this time the bulk of the traffic has been handled by the American International Shipbuilding Corporation's own shuttle train and by workmen's trains on the Pennsylvania Railroad and the Philadelphia & Reading Railroad.

Knoxville Railway & Light Company, Knoxville, Tenn.—Plans are being made to construct a viaduct on Gay Street from Depot to Vine Avenue to

cost about \$200,000. The cost will be borne by the City of Knoxville, the Southern Railway and the Knoxville Railway & Light Company. J. B. McCalla, city engineer.

Morgantown & Wheeling Railroad, Morgantown, W. Va.—It is reported that a contract has been awarded to Kelly Brothers, Clarksburg, W. Va., for grading in connection with the improvement of the line of the Morgantown & Wheeling Railroad between Randall and Barker.

Shops and Buildings

Cincinnati & Dayton Traction Company, Cincinnati, Ohio.—Plans are being made by the Cincinnati & Dayton Traction Company to construct a new terminal on Spring Grove Avenue, Cincinnati.

Oklahoma Union Railway, Tulsa, Okla.—A new carhouse will be erected by the Oklahoma Union Railway at 700 South Maybell Street, Tulsa, to cost about \$25,000.

Power Houses and Substations

Pine Bluff (Ark.) Company.—A report from the Pine Bluff Company states that it will purchase two 600-hp. boilers.

Vincennes (Ind.) Traction Company.—This company reports that its power station at Vincennes has been abandoned and power is now being purchased from the Indiana Power & Water Company.

Kansas Electric Utilities Company, Parsons, Kan.—A frequency changer set of 1000-kva. capacity is being installed by the Kansas Electric Utilities Company in its power plant.

United Railways & Electric Company, Baltimore, Md.—A report from the United Railways & Electric Company states that it is now installing one 20,000-kw. turbo-generator in its Pratt Street power station.

Boston & Maine Railroad, Boston, Mass.—Plans have been prepared by the Boston & Maine Railroad for extensions and improvements in its power house near Lawrence. The work is estimated to cost \$14,000.

Atlantic Coast Electric Railway, Asbury Park, N. J.—A new power station is being built by the Atlantic Coast Electric Railway at Allenhurst, N. J., and it is expected that it will be ready for operation at an early date.

New York (N. Y.) Railways.—Plans have been prepared by the New York Railways for alterations and improvements at its station at 13-17 Front Street. The work is estimated to cost about \$6,000.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS

FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES • MARKET QUOTATIONS • BUSINESS ANNOUNCEMENTS

Coal Production and Transportation

Modified Mine-Run Coal Prices Fixed by Government—Labor Shortage Affects Anthracite

Following the report of the United States Geological Survey, for the week ending July 13, it is learned that the observance of July 4 caused bituminous coal production during the week of July 6 to decrease 2,081,000 net tons or approximately 17 per cent. The total output (including lignite and coal made into coke) is estimated at 10,259,000 net tons as against 12,340,000 net tons during the week preceding and 9,241,000 net tons during the current week of 1917. The average production per working day (five-day week) is estimated at 2,052,000 net tons, slightly lower than the average production per working day during the week of June 29 of 2,057,000 net tons and 11 per cent

ence between the applicable government mine prices for mine run and screenings at such mines, viz.:

Run of mine passed through—	Per Cent of Such Margin
2-in. openings.....	40
3-in. openings.....	75
4-in. openings.....	90
5-in. openings.....	95

Increased Cost of Production

Manufacturer Shows How Costs Have Advanced During First Six Months of 1918

While prices have advanced considerably in the electric railway field it is doubtful if the increases represent altogether the higher production costs with which the manufacturers have to contend. In this connection are given below some figures furnished by the Drew Electric & Manufacturing Company, manufacturer of electric railway, light, power and gas materials,

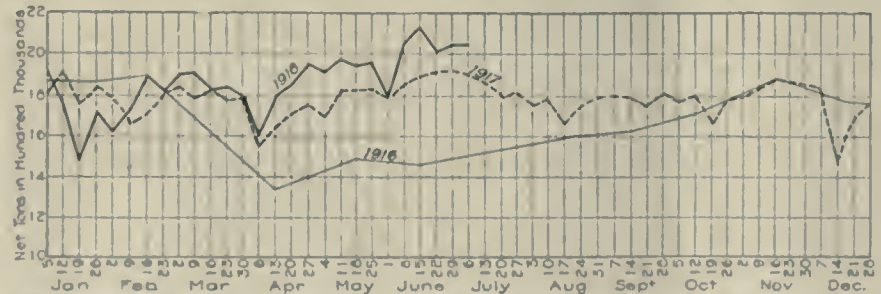
Cotton Costs Reflected in Electrical Goods

Advances in Cotton Goods and Yarns Account for Much of the Higher Cost of Insulated Wire, Tapes, Etc.

Rising prices of raw materials inevitably affect the cost of manufacturing electrical products of many kinds, though it is difficult to predict just what the influence of a given advance in raw-material cost will be upon the selling price of equipment in any particular case. There are two principal reasons for this—the latitude allowed the cost department or price-fixing branch of the manufacturing organization in compensating for the advance and the varying amounts of any particular material used in different types, forms or sizes of apparatus. Nevertheless, it is possible to instance actual figures drawn from practice to show that changes in raw or finished component material costs may have an appreciable effect upon the ultimate price of the finished product.

UPWARD TREND OF COTTON

An investigation along this line was recently made by the ELECTRIC RAILWAY JOURNAL with respect to the effect of price changes in cotton upon the selling price of electrical equipment. Cotton has undergone an extraordinary change in price since the beginning of the war. Spot cotton was quoted at 12.50 cents per pound in New York City on July 30, 1914, the day the Cotton Exchange closed, and on Nov. 16 of that year the price upon the reopening of the exchange had fallen to 7.75 cents. During the interim President Wilson inaugurated the "Buy a bale of cotton" movement, and at that time the price was about 10 cents. It is well known that since the fall of 1914 cotton has increased in price until it passed the 30-cent mark in the spring of this year, shot up to 36 cents or thereabouts on a speculative drive, and the quotation of June 22 was 30.4 cents. Electrical insulation is dependent upon cotton as its base material, and of tapes alone probably 97 to 98 per cent are fabricated of cotton yarns. Wire covering trolley cord and many other products are affected by the rising and falling prices of cotton, but it appears that the day-to-day temporary fluctuations have less influence upon the resulting cost of electrical equipment and supplies than the longer and more sweeping changes. The reason for this is doubtless that manufacturers are accustomed to purchasing raw material of a cotton base far ahead of the dates upon which this material is to be utilized in pro-



ESTIMATED AVERAGE TOTAL PRODUCTION PER WORKING DAY OF BITUMINOUS COAL INCLUDING COAL COKED

greater than average production per working day during the week of July 6, 1917. Railroad shipments during the week decreased from all districts. Improper working conditions with a better car supply, are reported in a majority of the coal fields.

A shortage of mine labor may cause a curtailment of anthracite allotment, contemplated by the Fuel Administration for the twelve months to April 1 next. Such allotment was based upon an estimated production of 54,345,783 tons of domestic anthracite for the coal year. The actual output of domestic anthracite sizes for the three months period to the end of June was 13,279,889 tons. That is, at the rate of 53,120,000 tons for the year, or 1,226,000 tons less than was counted upon in the estimate.

The prices of "modified mine-run" coal shipped on and after July 5 have been fixed f.o.b. cars at the mine per net ton at not to exceed the applicable government mine prices for screenings at the mine where such "modified mine-run" coal is produced plus the following percentages of the margin or differ-

Indianapolis, Ind. These figures show the increases in costs during the first six months of 1918.

	Per Cent Increase
Copper	10.6
Lead	12.3
Tin	44.5
Zinc	12.9
Malleable Iron.....	10.0
Molders and coremakers.....	33.3
Furnace tenders.....	25.0
Laborers	20.0
Machinists	20.0
Freight rates	25.0
General expenses (estimated) such as postage, printing, advertising, office supplies, fire and liability insurance, clerk hire, etc.	20.0

"The above comparisons," says James H. Drew, president of the company, "speak for themselves. Considerably more might be said on the subject of other handicaps that confront the manufacturer at this time, such as traveling expenses, migratory tendencies of skilled and unskilled labor, restrictions on raw material, delays in receiving raw material, delay in payment of accounts, and many other subtle and hidden items that run up the cost of manufacture and cannot be discovered until the balance sheet is brought in."

duction, and the market price at some future time may be taken into account rather than the price actually paid some months previously for a given consignment of insulating material base, when the establishing of sales figures takes place.

CHANGES IN PRICE OF GOODS

The accompanying table gives an idea of the changes in price which have occurred since the war began, the increases ranging from 106 to 342 per cent. These materials all bear the marks of increased labor cost as well of increased raw-cotton price, and in the case of tape alone it is known that labor cost has increased certainly 50 per cent since the outbreak of the war.

	Before the War	Last Paid	Approximate per Cent Advance
68/72 gray goods, lb.	\$0.06	\$0.21	250
4/4 muslin, yd.	0.08	0.255	219
Cotton tape, gr. yd.	0.385	1.05	173
Varnished cloth, yd.	0.108	0.307	184
Cotton yarn, coarse, lb.	0.215	0.95	342
Cotton yarn, fine, lb.	0.85	1.75	106

On account of the increase in the price of material manufactured from cotton, the total cost of generators and motors, which are insulated with cotton tape, has been increased from 0.05 per cent to 1.5 per cent.

EFFECT ON WIRE AND CORD

In the case of the coarser sizes of wire the range in price from the beginning of the war was from about 14 cents per pound to 39 cents, this of course being due in part to the increase in the price of copper and also to higher labor charges. An analysis by the cost department of a prominent wire maker indicates that of this increase probably about 7 cents per pound can properly be charged to the rise in the price of cotton from 12.5 cents to 30 cents. Magnet wire rose from 18 cents to 33 cents per pound between 1914 and 1918, and about 9 cents of this may be attributed to cotton price advance, the smaller wire having a relatively larger amount of cotton insulation. Trolley cord increased from 35 to 75 cents per pound during a period when cotton advanced from 10 to 35 cents, and about 60 per cent of the advance in the price of cord, or 24 cents, may be charged to cotton, labor cost having about doubled in the period.

New Equipment to Be Provided for Boston Elevated

New equipment will be provided for the Boston (Mass.) Elevated Railway as soon as war conditions will permit, it was announced after a meeting of the trustees of the company on July 2. The road went over to public management on July 1 under the recent law providing for service at cost with an ultimate return of 6 per cent on the investment, and the trustees anticipate availing themselves of the options and bids made not long ago to the company on new cars and other equipment. The company has secured quotations on 100

new center-entrance motor cars and 100 trailers, but it will be several months before deliveries can be made on account of the absorption of materials and labor by the government.

Rail Prices Still Under Consideration

Stand Taken for \$42 a Ton for Bessemer Product in Spite of Higher Cost

Rail prices and prices on other parts of the steel output were under consideration on Monday at a meeting in New York of the Director of Steel Supply and the steel producers' committee. No decision was reached, however.

Rolling Stock

Rochester & Syracuse Railroad, Inc., Syracuse, N. Y., has placed an order for a double truck snowplow sweeper from the Russell Snow Plow Company, through Wendell & MacDuffie, its representatives in this territory.

Tampa (Fla.) Electric Company's order for eight Birney-type safety cars, referred to in the ELECTRIC RAILWAY JOURNAL of July 6, was placed with the American Car Company, St. Louis, Mo., and not the St. Louis Car Company.

United Railways Electric Company, Baltimore, Md., advises the ELECTRIC RAILWAY JOURNAL that the cars referred to on July 6 as ordered by the company, are "merely the equipment of twenty high-speed double-truck cars with multiple-unit control."

Philadelphia, (Pa.) Rapid Transit Company has ordered fifty additional cars, duplicates of former types, from the J. G. Brill Company. The cars were purchased and will be delivered under priority certificate before next winter. The cars, complete, cost \$13,000 each. This totals 150 cars on delivery from the Brill Company. The Philadelphia Company is reported as also re-equipping and overhauling several hundred other cars at a cost of about \$1,000 each.

Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., referring to the action of the City Council of Terre Haute approving the purchase of thirty one-man cars for the Terre Haute Traction & Light Company, states under date of July 15 that the contract for these cars has been verbally closed, but the official contract has not yet been signed. The cars are of the Birney one-man standard type, as manufactured by the American Car Company, St. Louis, Mo., and with the regular standard equipment and safety devices specified on the Birney one-man car with a seating capacity of twenty-eight. The cars were practically bought as stock equipment. Reference to this order was made in the ELECTRIC RAILWAY JOURNAL last week.

There is but 100,000 tons additional of rail wanted for this year but, it is understood, the Railroad Administration wants the price fixed because of large purchases to be made in 1919.

A stand has been taken for \$42 a ton for Bessemer rails in spite of an average cost of production of \$50 or more. One prominent producer contends that the rail manufacturer should receive \$60 for Bessemer and \$65 for open-hearth rails.

Iron Age suggests that "a possible solution of the rail controversy is the payment of different prices to different mills in view of widely differing costs. This might be worked, seeing that the government will take nearly all the output."

Wilmington & Philadelphia Traction Company, Wilmington, Del., whose order for twenty-two new cars, placed with the J. G. Brill Company, mentioned in the ELECTRIC RAILWAY JOURNAL of July 6, are being bought by the United States Shipping Board, Emergency Fleet Corporation, and come through on a priority preference. They are to be operated on the company's lines between Darby and Chester, Pa. This rolling stock is to be leased by the Wilmington & Philadelphia Traction Company and will eventually become its property. The specifications follow:

Number of cars ordered.....	22
Date order was placed.....	June 24, 1918
Date of delivery.....	90 to 120 days
Builder of car body.....	J. G. Brill Co.
Type of car.....	Passenger, motor
Seating capacity.....	52
Weight:	
Car body.....	21,000 lb.
Trucks.....	14,000 lb.
Equipment.....	12,000 lb.
Total.....	47,400 lb.
Bolster centers, length.....	21 ft. 10 in.
Length over all.....	45 ft. 4 in.
Truck wheelbase.....	5 ft. 9 in.
Width over all.....	8 ft. 6 in.
Height, rail to trolley base.....	11 ft. 5 in.
Body.....	Semi-steel
Interior trim.....	Cherry
Headlining.....	Nevasplit
Roof.....	Arch
Air brakes.....	General Electric, straight with emergency
Armature bearings.....	Babbitt lined
Axles.....	Hammered steel
Bumpers.....	Hedley
Car signal system:	
Consolidated Car Heating buzzers and bells and pneumatic door light signal	
Car trimmings.....	Car builder's
Center and side bearings.....	Brill
Control.....	Pneumatic for two-car train operation
Couplers.....	Tomlinson form 8
Curtain fixtures.....	Curtain Supply
Curtain material.....	Pantasote
Designation signs.....	Electric Service
Door operating mechanism.....	National
Pneumatic manual air operated	
Fare boxes.....	Johnson
Fenders or wheelguards.....	H-B
Gears and pinions.....	G. E. heat treated
Hand brakes.....	National Staffless
Heater equipment.....	Peter Smith electric
Headlights.....	Ohlo Brass, gold ray
Journal bearings.....	Plain
Journal boxes.....	Brill
Lightning arresters.....	M. D-3
Motors, type and number.....	4 G. E.-247-D, inside hung
Registers.....	International double
Sanders.....	Ohlo Brass, air controlled
Sash fixtures.....	O. M. Edwards
Seats.....	Brill reversible
Seating material.....	cherry slats
Slack adjuster.....	Anderson
Springs.....	Brill
Step treads.....	Universal
Trolley catchers or retrievers.....	Ohlo Brass
Trolley base.....	U. S. 11
Trolley wheels or shoes.....	5-in wheel
Trucks.....	Brill, 27 M. C. B-1
Ventilators.....	Railway Utility
Wheels (type and size).....	33-in. rolled steel
Special devices, etc.....	Simplex Jack

Trade Notes

Standard Underground Cable Company, Pittsburgh, Pa., last week sold \$40,000 of lead-covered cable to the Georgia Railway & Light Company.

Tubular Woven Fabric Company Pawtucket, R. I., has received an order from the Bay State Street Railway, Boston, Mass., for 500 ft. of 1½-in. and 200 ft. of ¾-in. Duraduct.

M. H. Callan, general manager of plants, and W. P. Pussinger, general manager of sales, have been elected vice-presidents of the Chicago (Ill.) Pneumatic Tool Company.

Dual Welding Apparatus, Elizabeth, N. J., has been chartered with a capital stock of \$50,000 by M. Lucas, Frederick De Meese and Robert Zuber of Elizabeth. The company proposes to manufacture welding equipment.

Babcock & Wilcox Company, Bayonne, N. J., manufacturer of boilers, etc., has commenced operations in a large new addition to its plant recently completed. The structure, which with its new equipment is estimated to cost \$1,500,000, is about 150 ft. x 330 ft.

Henry R. Worthington Company, Harrison, N. J., manufacturer of pumping equipment, is said to be considering plans for extensions to its plant on property recently acquired adjoining its works, at Ann Street and Ogden

Avenue. The property is about 65 ft. x 225 ft.

Railway Improvement Company, New York, N. Y., announces that it has received an order for Rico anti-climbers to take care of the fifty additional new cars for the Philadelphia Rapid Transit Company's Hog Island service. The first 100 cars recently constructed for this service are also equipped with Rico anti-climbers.

Westinghouse Air Brake Company, Pittsburgh, Pa., at a recent meeting of directors, elected George W. Wildin general manager of the company, vice A. L. Humphrey, resigned. Mr. Humphrey continues as ranking vice-president and in that capacity will as heretofore have general direction of the company's operations in all departments and subsidiary organizations, Mr. Wildin reporting to him.

W. L. Chandler, of the Dodge Sales & Engineering Company, Mishawaka, Ind., as chairman of the standardization committee of the National Association of Purchasing Agents, informs the ELECTRIC RAILWAY JOURNAL that the National Retail Hardware Association, made up of twenty-nine affiliated organizations, has indorsed the standard size 7½ in. x 10% in. for all catalogs and similar literature.

"Iron Trade Review," Cleveland, Ohio, has published a revised and amplified booklet giving the complete schedules of maximum prices on iron, steel and non-ferrous products as fixed

by the government, which now are in effect. It is claimed to be the only up-to-date price manual on iron and steel now in circulation, as the numerous changes during the past six months have rendered practically obsolete those previously printed.

J. W. Maloney on July 1 severed his relations with the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., to begin practice as a consulting mechanical and electrical engineer in New York, N. Y. He will specialize in the design and application of railway brake and control apparatus of the mechanically, electrically or pneumatically operated forms. Mr. Maloney's experience in these lines has extended over a period of more than twenty years. Until further notice, his address after July 1, will be 574 Eighty-first Street, Brooklyn, N. Y.

New Advertising Literature

Du Pont Chemical Works, New York, N. Y.: "Tar Products," a twelve-page pamphlet describing their nature and use.

Bastian-Blissing Company, Chicago, Ill.: Catalog illustrating and describing the "Rigo Welding and Cutting Apparatus." Complete units are first outlined in the pages of this interesting publication, followed by a detailed description of regulators and torches.

NEW YORK METAL MARKET PRICES

	July 10	July 17
Copper, ingots, cents per lb.	26	26
Copper wire base, cents per lb.	30	29.25
Lead, cents per lb.	8.05	8.05
Nickel, cents per lb.	40	40
Spelter, cents per lb.	8.87½	8.90
Tin, Chinese, cents per lb.	92	92
Aluminum, 98 to 99 per cent., cents per lb.	133.00	133.00

* No Straits offering. † Government price in 50-ton lots or more, f. o. b. plant.

OLD METAL PRICES—NEW YORK

	July 10	July 17
Heavy copper, cents per lb.	23½	23½
Light copper, cents per lb.	20	20
Red brass, cents per lb.	19	22
Yellow brass, cents per lb.	13	14
Lead, heavy, cents per lb.	7	7
Zinc, cents per lb.	5½	5½
Steel car axles, Chicago, per net ton.	\$41.52	\$41.52
Old carwheels, Chicago, per gross ton.	\$29.00	\$29.00
Steel rails (sear), Chicago, per gross ton.	\$34.00	\$34.00
Steel rails (relaying), Chicago, gross ton.	\$60.00	\$60.00
Machine shop turnings, Chicago, net ton.	\$16.25	\$16.25

ELECTRIC RAILWAY MATERIAL PRICES

	July 10	July 17
Rubber-covered wire base, New York, cents per lb.	30 to 37	30 to 39
Weatherproof wire (100 lb. lots), cents per lb., New York.	32.10 to 32.40	32.40 to 34.10
Weatherproof wire (100 lb. lots), cents per lb., Chicago.	33.42 to 35.00	35.00 to 37.72
T rails (A. S. C. E. standard), per gross ton	\$70.00 to \$80.00	\$70.00 to \$80.00
T rails (A. S. C. E. standard), 100 to 500 ton lots, per gross ton.	\$67.50	\$67.50
T rails (A. S. C. E. standard), 500 ton lots, per gross tons.	\$62.50	\$62.50
Trail, high (Shanghai), cents per lb.	4½	4½
Itala, girder (grooved), cents per lb.	4½	3½
Wire nails, Pittsburgh, cents per lb.	3½	3½
Railroad spikes, drive, Pittsburgh base, cents per lb.	4½	4½
Railroad spikes, screw, Pittsburgh base, cents per lb.	8	8
Tie plates (flat type), cents per lb.	3½	3½
Tie plates (brake type), cents per lb.	3½	3½
Tie rods, Pittsburgh base, cents per lb.	7	7
Fish plates, cents per lb.	3½	3½
Angle plates, cents per lb.	3½	3½
Angle bars, cents per lb.	3½	3½
Rail bolts and nuts, Pittsburgh base, cents per lb.	4.90	4.90
Steel bars, Pittsburgh, cents per lb.	5	5
Sheet iron, black (24 gage), Pittsburgh, cents per lb.	4.90	4.90
Sheet iron, galvanized (24 gage), Pittsburgh, cents per lb.	5.80	5.80
Galvanized barbed wire, Pittsburgh, cents per lb.	4.35	4.35

	July 10	July 17
Galvanized wire, ordinary, Pittsburgh, cents per lb.	3.95	5.95
Car window glass (single strength), first three brackets, A quality, New York, discount.	80%	80%
Car window glass (single strength), first three brackets, B quality, New York, discount.	80%	80½%
Car window glass (double strength, all sizes AA quality), New York discount.	82 & 3%	82 & 3%
Waste, wool (according to grade), cents per lb.	11½ to 22	11½ to 22
Waste, cotton (100 lb. bale), cents per lb.	13 to 13½	13 to 13½
Asphalt, hot (150 tons minimum), per ton delivered.	\$38.50	\$38.50
Asphalt, cold (150 tons minimum, pkgs. weighed in, F. O. B. plant, Maurer, N. J.), per ton.	\$42.50	\$42.50
Asphalt filler, per ton.	\$45.00	\$45.00
Cement (earload lots), New York, per bbl.	\$3.20	\$3.20
Cement (earload lots), Chicago, per bbl.	\$3.34	\$3.34
Cement (earload lots), Seattle, per bbl.	\$3.68	\$3.68
Lined oil (raw, 5 bbl. lots), New York, per gal.	\$1.64	\$1.80
Lined oil (boiled, 5 bbl. lots), New York, per gal.	\$1.65	\$1.81
White lead (100 lb. keg), New York, cents per lb.	10½	10½
Turpentine (bbl. lots), New York, cents per gal.	75	75

* Government price. † These prices are f. o. b. works, with boring charges extra.



The PEACOCK

In Daily Use on Many Austin Cars

There must be a sound reason for the answer of so many master mechanics to the question:

“Any maintenance troubles with your Peacock Brakes?”

When they reply:

“What do you mean by maintenance troubles. All we know

is that the Peacock Brake is doing all that is expected of it without bothering the shop.”

And that's how it is at Austin, where there are plenty of Peacocks of vertical wheel type in regular use. The Peacock is the kind of brake to specify!

National Brake Co.
Buffalo, N. Y.



The Eccentric Drum

Bankers and Engineers



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TRAFFIC SURVEYS AND SCHEDULES
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VANDERBILT SUPERVISION OF CONSTRUCTION 343
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Ford, Bacon & Davis, Engineers.

115 BROADWAY

New Orleans NEW YORK San Francisco

You are a faithful subscriber and reader of the
Electric Railway Journal. You know how useful it is
to you. Why not give us the names of those of your
electric railway friends who would also benefit by being
subscribers to the Electric Railway Journal? We will
be glad to send specimen copies to any names and
addresses that you mention.

ELECTRIC RAILWAY JOURNAL

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Analytical Studies of financial and operating conditions,
appraisals and rate adjustments of electric railway and
all public utility properties.

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Park Row Bldg., New York Board of Trade Bldg., Boston

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tion of the Electric Railway Journal would be appreciated.

ELECTRICAL TESTING LABORATORIES
Electrical, Photometrical and
Mechanical Testing.

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POWER STATIONS PHILADELPHIA, PA.
HYDRAULIC DEVELOPMENTS GAS WORKS
ELECTRIC RAILWAYS

The Thermit Process of Track Welding

Makes Permanent Joints

Costs Less in the End



The Thermit Process is the only method of rail welding which solves the problem by eliminating the joint, making a perfect weld between the rail heads. This method is much superior, both mechanically and electrically, to any other kind of joint. It makes a permanent union, which will last as long or longer than the rails proper. It has an electrical conductivity equal to the rail itself. Failure of a joint to conduct ALL the electricity to the power house means loss of energy, electrolysis and interference with nearby low voltage circuits.

Our Catalog No. 12, free on request, describes the Thermit insert rail weld and shows why this process is not only the best solution of the rail joint problem, but is also the least expensive method in the end, making due allowance for all considerations entering into track welding.

*May we send you this catalog, or better still,
may we discuss track welding with you?*

METAL & THERMIT CORPORATION

Successors to Goldschmidt Detinning Co. and the Goldschmidt Thermit Co.

120 BROADWAY, NEW YORK

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Factories located at Chrome, N. J.; Wyandotte, Mich.; East Chicago, Ind.; Jersey City, N. J.

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First Cost *and* Final Cost

Wooden ties, without any of the labor cost of laying, are cheaper, piece for piece, than Dayton Mechanical Ties—we freely admit that!

Untreated wooden ties completely installed with gravel ballast cost 6% more than Dayton Mechanical Ties for the same length of track.

Wooden ties, at the end of ten years, cost more than twice as much as Dayton Mechanical Ties.



Furthermore :

D.M. Ties are permanent.

D.M. Ties outlast the pavement.

D.M. Ties are cushioned with an asphalt base, under the wooden rail support.

D.M. Ties are attached to the rails as shown in the picture on the left.

D.M. Ties form a rigid, reinforced concrete bed, each tie resting on its own highly resilient cushion.

Your inquiry for full particulars regarding Mechanical Railway Ties will be a step in the direction of better economy. Write today.



THE DAYTON MECHANICAL TIE CO.

201 Third Street Arcade

DAYTON, OHIO





BECAUSE of the many requests that we have received asking us to rent our DYNAMOTOR for rail bonding, shop-welding and building up cupped rails, we have inaugurated a selling plan whereby small monthly payments may be made; all rent to apply on the purchase price, if it is decided later to keep the machine.

The superiority of the LINCOLN DYNAMOTOR, from the standpoints of efficiency and economical operation, has been demonstrated by many street railway companies. The monthly saving by using our DYNAMOTOR will amount to more than three months' rental.

This is an opportunity for you to equip properly for rail bonding, shop welding and repair work, without having to charge the entire price of a machine to your operating expense or machinery investment account. Just place us on your payroll.

Full details regarding the plan will be given you if you fill in and return the coupon.

This is an exceptional opportunity for you—get busy!

THE LINCOLN BONDING COMPANY

General Offices: CLEVELAND
New York Office: 30 Church St.

AGENTS:

BOSTON, Chas. N. Wood Co.
PHILADELPHIA, Railway Track-work Co.
PITTSBURGH, Electrical Engineering & Manufacturing Co.
CHICAGO, Holden & White, Inc.
ST. LOUIS, W. L. Rose Equipment Co.
CANADA, Lyman Tube & Supply Co., Ltd., Montreal, Toronto, Winnipeg.

The
Lincoln
Bonding Co.
Cleveland, O.

Please give me details of
your new rental plan for
Lincoln Dynamotors.

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NO "Kick-ups" are possible



Absorbs
Vibration Here

Nelsonville Stretcher Brick
Nelsonville Filler Brick

with Nelsonville Brick

Girder rail is heavier, more expensive, and less satisfactory in wearing qualities than T-rail.

The great trouble with T-rails in street pavements has been the tendency of the blocks between the T-rails to "kick-up."



The insertion of Nelsonville Stretcher and Filler Bricks, as shown in the picture above, does away with "kick-up" dangers by absorbing all vibration.

This means that the old reliable, economical T-rail can be used in street car tracks to good advantage.

Get Our Literature Today

THE NELSONVILLE BRICK CO.

Nelsonville, Ohio

“DELTABESTON” MAGNET WIRE prevents Arc Head Light Burn-Outs

TROUBLE caused by burnout of magnets on your arc headlights can be overcome, the remedy is—“Deltabeston”—the all-asbestos insulated magnet wire.

It's more than a remedy—it's a prevention. Withstanding excessive heat and moisture, it insures satisfactory service.

Deltabeston is the ideal wire for railway motors, too. Served on Seattle's motors 14 years without a breakdown. This is only one of our satisfied customers.

Get in touch with us for any further data needed—or for advice concerning any D & W Product.



D & W FUSE CO.
PROVIDENCE, R. I.



HOT BOX TROUBLE ALMOST ELIMINATED



Perfectly Saturated Waste is absolutely necessary to Lubricate Journal Boxes, obtain the GREATEST MILEAGE, and Cut Down the loss of Oil which is wasted, when journals are lubricated the ordinary way.

The MILWAUKEE WASTE SATURATING SYSTEM provides for a 24-hour saturation and 24-hour draining. Thus when you pack a journal, every fibre of the cotton waste is PERMEATED, and there is not a drop of oil lost by dripping—because there is no

free oil left to drip. It has drained into the

Lower Storage compartment of the Tank, and CAN BE USED OVER AGAIN.

The result is from 10,000 to 15,000 miles on a single journal packing—cutting out HOT BOXES almost Entirely, and saving about ONE-THIRD THE OIL. No matter how small or large your Road, one or more of these Outfits will save its cost in from ten to sixty days. You know how expensive Hot Boxes are.

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*Complete Oil House Equipment
Self-Measuring Pumps and Tanks
Single Outfits, or in Series, with Barrel Tracks
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Quick Deliveries, High-Class Workmanship that satisfies such roads as Cleveland Railways Co., Chicago Elevated Lines, Northern Ohio Traction Co., Milwaukee El. Ry. & L. Co. and many others, who have used our Product for the past five years.



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It illustrates in colors, and describes our Line, and contains complete price list. Every purchasing agent, master mechanic and superintendent should have a copy.

MILWAUKEE TANK WORKS
MILWAUKEE, WISCONSIN





The High Cost of Operating

can be reduced if, instead of running the wires through metal conduit in your cars, you use

DURADUCT

(Reg. U. S. Patent Office)

Some engineers estimate it costs 5 cents per pound per year to propel a car. If you save 500 pounds in weight by using DURADUCT in place of metal conduit, you save on this basis \$25.00 per year for each car, or \$5000.00 for 200 cars. On some types of cars DURADUCT saves more than 500 pounds on other types less.

Our pamphlet "Specifications for Street Car Wiring" will give you an idea of what you can save, as it diagrams the wiring for different styles of cars, and gives a comparison of weights of metal conduit and DURADUCT.

Send for a copy.

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 MANUFACTURERS • PAWTUCKET, R. I.
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Coil Repairs vs. Coil Restoration

Repairs to field and armature coils are costly or cheap according to the thoroughness with which the work is done. Careful work and the best materials make it possible to restore coils to their original state. That is always the most economical method. The difference in cost between the cheapest materials and the best is negligible.

For coil repairs, for taping cable leads and all other insulating windings, specify

Irvington Black Varnished Cambric

Time Proves Its Superiority

Black and Yellow Varnished Cambric
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 Oiled Silks Oiled Papers
 Black and Yellow Insulating Varnishes
 Black and Yellow Flexible Varnished
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IRVINGTON VARNISH & INSULATOR CO.
Irvington, New Jersey.

They Like to Use the Johnson Fare Box

The reason why they like to use the Johnson Fare Box is shown by the users in a number of letters. Read why.

"We installed twenty-five of the Johnson Fare Boxes in the cars on our city lines December, 1916, and they have been in constant use since.

"They have rendered very satisfactory service and have given very little mechanical trouble. The continuation of their use in service on our lines is our best recommendation as to their merit."

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"The Johnson Fare Boxes are used on a number of our trunk lines with satisfactory results. The writer was for many years identified with the _____, during which time he had occasion to try out several types of fare boxes with the result that we finally adopted the Johnson Fare Box as standard for the system.

"In view of the good results obtained from the use of the Johnson Fare Box, it is the intention of this company to ultimately so equip all of the cars on this system."

NEW ORLEANS RAILWAY & LIGHT CO.

"We have 345 Johnson Fare Boxes in service. They have proven very satisfactory because they have not slowed up operation, they have lessened accidents, they have promoted a clean-cut business-like method of collecting fares, and finally, we get the money."

THE DENVER TRAMWAY COMPANY.

"We have 208 Johnson Fare Boxes in service, a number of which have been in service two years. We have yet to find a cause for complaint."

THE CONNECTICUT COMPANY.



**Johnson
Fare Box Co.**

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**Use the
Johnson Fare Box**



Have it sent to your home Why?

Electric Railway Journal's service is of permanent value

Every issue contains articles for which you may have no immediate use. You read them—they interest you—you store away their salient points in some crowded corner of your brain—and straightway forget them.

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when you would give your head to be able to lay your hands quickly upon something you remember to have read in the Journal—not merely the high spots, but the detailed facts and figures.

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THIS YEAR

will witness many strides toward the permanent settlement of many of the burning questions now agitating the industry. These developments will leave their mark upon the common practice for years to come. You will want to refer to them repeatedly long after the present transition period is over. Beginnings are always interesting. The beginnings of many of the movements now in the bud are unusually so. They spell REVOLUTION all over—they forecast the entire reshaping of electric railway practice—many of their elements that now appear to be of minor import will hereafter be regarded of weighty consequence.

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Get them permanently—get them at your home**

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will insure them to you in the way they will be of the greatest service to you. Never mind the money now—simply fill in and mail the coupon at once—

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Hot Box Accidents Must Go



COSMIC METAL BEARINGS

Prevent Hot Boxes—Eliminate Babbitting

If we fail to eliminate your Bearing Troubles,
no matter how chronic, we make no charge.

Cosmic Metal bearings for armature, axle or motor are made exceptionally strong and tough, to give long life and a slow, even rate of wear. Under actual working conditions and tests they have proved far more dependable than bearings made of other metals. They have sufficient strength to carry any load and are easily lubricated. If, through accident or other cause, they should not be properly lubricated, they will continue to run *without injuring the machinery* until attended to.

This is a very important point, because ordinary

bearings which are improperly lubricated, or hard to lubricate, will generate intense heat. This rapidly causes the bearing to melt, or to fuse and stick, causing serious and costly damage to machinery.

Bearings made of Cosmic Metal will not stick or grab the shaft or axle, even though lubrication does not reach them. They prevent hot boxes with their resultant accidents, and in the end are a much safer and more economical equipment than any other bearing. Let us send further information.

COSMIC METAL COMPANY

42 Walnut Street, Philadelphia

EXPERIMENTS with certain machinery are all well and good when one has time, but in this day you want an article that you *know* will deliver the goods. That is what you get in the

V-K

OILLESS TROLLEY WHEEL and V-K NON-ARCING HARP

The experience, organization and reputation of the manufacturer behind this V-K combination protect your interests.

This V-K equipment provides a better form of contact. It reduces current waste and prevents all arcing due to loose fitting axle pins, because the patented gripping device locks the pin securely in its socket. *Having an oilless bearing there is no insulation. This greatly improves current flow and lengthens life of wheel, harp and overhead.

Illustrated Catalog on request.

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ST. LOUIS, MO., U. S. A.

Charlotte Has Been Boyerized for Four Years and not a Pin Replaced



More than four years ago the Southern Public Utilities Company, Charlotte, N. C., began to use Boyerized Brake Pins and Bushings.

Charlotte cars make 45,000 to 48,000 miles a year at a schedule speed of 9.5 m.p.h.

That means nearly 200,000 miles of service.

Yet not one Boyerized Pin has been removed for wear!

If it's safety and economy you are after, Boyerize!

ELECTRIC RAILWAY SUPPLIES

Bemis Car Truck Company

SPRINGFIELD MASS

Stronger—Yet 25% Lighter



The Anderson Sheet Steel Insulated Crossing

Made of the best homogeneous sheet steel and fitted with renewable insulated runways to insure long life under heavy service.

A big improvement over ordinary types. A money saver under all conditions. Install them on your crossings.

We make a full line of high-grade line materials.
Write for Catalog No. 8 giving full description.

ALBERT & J. M. ANDERSON MANUFACTURING CO.

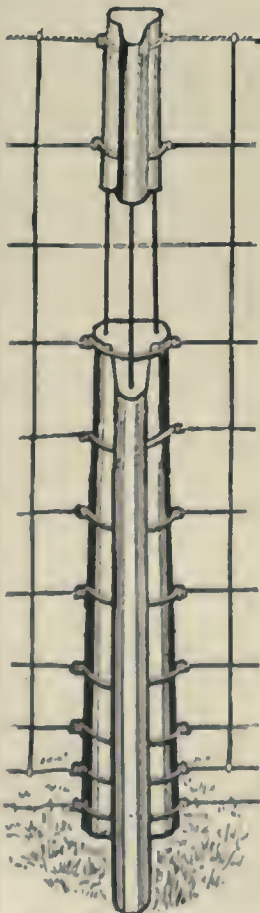
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Seven Posts to the Sack

Just to save a few dollars makeshifts are sometimes put in.
This is no time to put in a makeshift fence—and pay for it again in the future.
No time, especially when with

Standard Fence Post Moulds

All Steel

McElroy System

you can get seven standard posts out of each sack of cement—and keep your labor charge very low. Note the T-shape of the posts—a big saving there.

Assembled "Fool-proof" Towers insure uniform strength.

Why experiment? We offer you 20 years' experience as fence experts. Over 12 years of extensive manufacture of Concrete Fence Posts and Steel Moulds, handling hundreds of miles of fence contracts. More than a million posts in Iowa alone. Others in 38 States.

WE USE ONE-FOURTH-INCH ROUND DEFORMED BARS.

Write for full details of Standard Post Forms and Stan-Ste-MoC Building Rock Forms today.

Standard Steel Mould Co.

99 Second Ave.
Cedar Rapids, Ia.



The Post Form

"Concrete for Permanence"



ERICO

Rail Bonds Bonding Equipment Arc Welding Outfits

All are dependable goods backed by a dependable organization. Let us try where others fail.

The Electric Railway Improvement Co., Cleveland

For Finishing Manganese Steel Frogs



Grinding the fishing section of a rail on a solid manganese steel frog to match the contour of the rolled rail with which it connects, is neither a difficult nor a delicate job but it requires the correct wheel for the work—one that will cut away the metal quickly and yet stand up under long and hard service. In this particular instance, a 20 P. ALUNDUM wheel size 10 x 1 in., is being used, and continued demand testifies as to the results.

(903)

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Company**
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Plants:*

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The Weiss Switch Lock Prevents Split Switches

**Waterproof
Non-Freezable**

**Dirt-Proof
Indestructible**

A positive railway switch lock that locks both right and left. It locks the switch so tightly that it prevents any possible chance of a split switch. Box is absolutely tight, having a stuffing box where the rod passes through. This prevents loss of oil, with which the box is filled. It is practically indestructible.

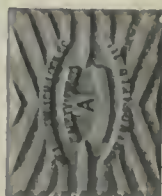
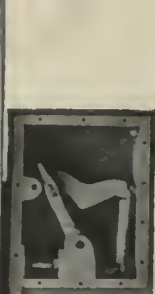
**Simple in
Construction**

This lock has no complicated mechanism. It is of very simple design, has few parts, and is mechanically perfect. It is strong

and heavy, and cannot be damaged by heavy traffic. In ordering, give measurements from top of rail to center of bolt holes. Trial installation sent on approval.

WEISS SWITCH LOCK CO.

312 S. Fifth St., Springfield, Ill.



The Reading Reversible Rail Bender

**A Right and Left Hand
Bender Combined**

It has a greater working radius than any other Rail Bender on the market. It will bend a Rail nine inches from the end, either right or left without adding another section of Rail and Splice Bar.

You can make your own Guard Rails. You can stock your Rails at the switch points, without removing points. You can take out your surface kinks.

You can save money by letting us explain further the many uses of our Right and Left Hand Bender.



Size—A

For bending all sections "T" rail
up to 100 lb.

THE READING SPECIALTIES COMPANY

Reading, Penn.



NO CLAMPED or CEMENTED FITTINGS

Metal Bushings, Die-cast on Porcelain, Distribute Stress Uniformly.

Note the TRIPLE protection—The knurled surface of the porcelain to prevent rotation; the grooves to prevent sliding, and the grips of the die-cast metal bushing which equalizes all irregularity of the porcelain.



“FRANKLIN” BUS BAR SUPPORTS

Stronger Mechanically and Stronger Electrically

For safety of bus structure continuous service—use “FRANKLIN” Bus Bar Supports. They have greater cantilever strength, no flashover points—they hold the bus bars firmly.

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They are guaranteed by the world's largest rubber manufacturer.

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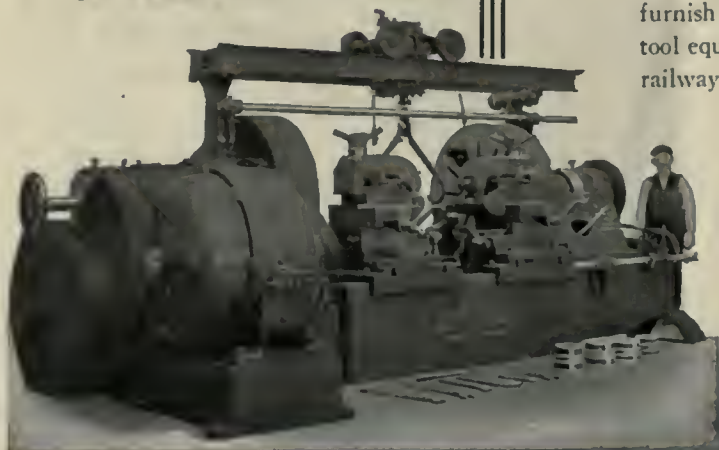
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For Electric Railway Repair Shops

Car Wheel Lathe



We are in a position to furnish complete machine tool equipment for electric railway repair shops, in-

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Our Line Includes

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Under present day conditions the rolling mills are giving preference to Government requirements resulting in uncertain supply and deliveries on private contracts.

Chillingworth Gear Cases are made from special deep drawn steel plate made especially for us, therefore we are dependent upon mill deliveries and tonnage to complete orders booked.

Anticipate your requirements and order now so that we can consolidate your order with others in our plate specifications to the mill, insuring greater tonnage from them and consequent quicker shipment of cases to you.

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Saves Money and Increases Profits and Savings



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In ten seconds you can change the harp without tools, simply with a "twist of the wrist." In sixty seconds you can substitute a new pole.

There are other features which a trial will demonstrate.

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our
Catalog.*

Bayonet Trolley Harp Co.
Springfield, Ohio



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THIS NOARK Renewable Fuse is a direct result of a demand for NOARK standards—built into a renewable fuse. And like all "NOARK" labeled products, it bears our guarantee that it is the best renewable fuse that can be built.

If you are using renewable fuses as a means of cutting fuse costs, NOARKS will appeal to you—in price, maintenance cost and construction.

Made in standard voltages and ampere capacity.

"NOARK" Renewable Fuses are manufactured by the Johns-Pratt Co., Hartford, Conn. H. W. Johns-Manville Co., Sole Selling Agents.

H. W. JOHNS-MANVILLE CO.
New York City
10 Factories—Branches in 61 Large Cities

NOARK

RENEWABLE FUSES



Johns-Manville

Steel for Service

Heavy loads on electric railway service have called for a forged axle of maximum strength and durability.

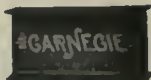
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The best quality of steel in connection with the most approved practice in treatment insures uniformity and superiority of

Carnegie Electric Railway Axles

The mark of
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It protects the
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1074



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Through an adaptation of the Van Dorn coupler shank the M. C. B. head can be installed on interurban cars without disturbing the present draft gear. The process is simple. The results are gratifying. With-

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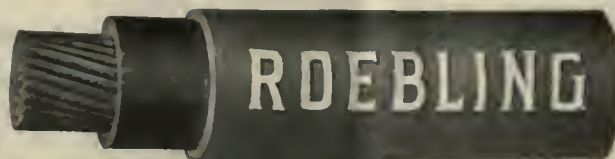
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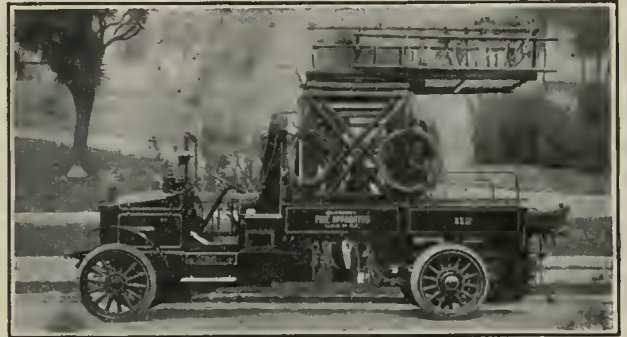
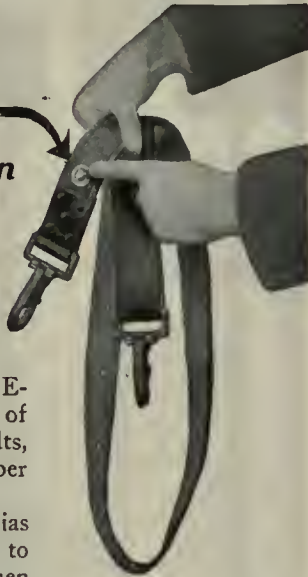
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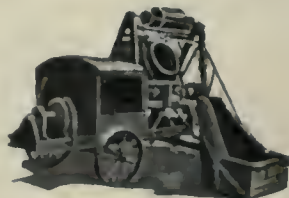
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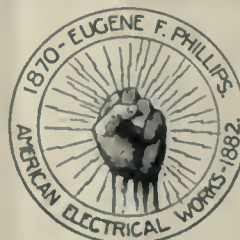
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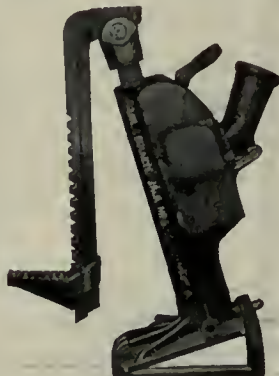
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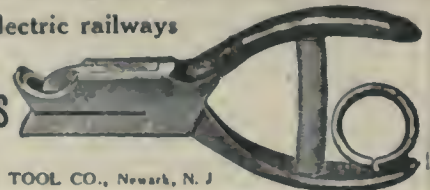
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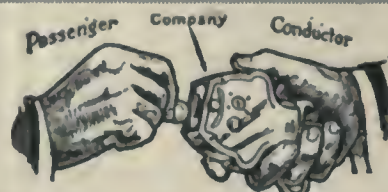


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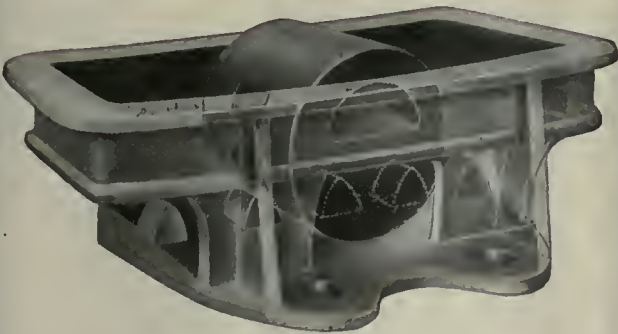
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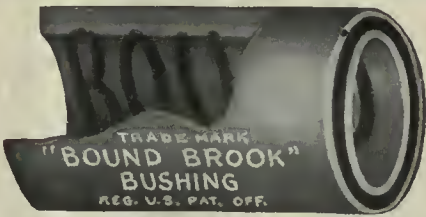
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cars and station steps.

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	Wheel Dia., Inches	Wheel Miles	Bushing Miles
Railway No 1—City	4	8,600	8,600
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Railway No. 2—	6	29,000	10,900
Railway No. 3	.	9,000	98% outlast the wheel
Railway No. 4	5	15,000	15,000 or more with better inspection
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The Kalamazoo Trolley Wheels

have always been made of entirely new metal, which accounts for their long life **WITHOUT INJURY TO THE WIRE**. Do not be misled by statements of large mileage, because a wheel that will run too long will damage the wire. If our catalogue does not show the style you need, write us—the **LARGEST EXCLUSIVE TROLLEY WHEEL MAKERS IN THE WORLD**.



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The "Hycap=Exide" Battery

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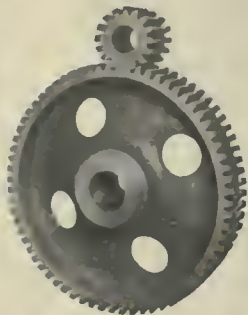
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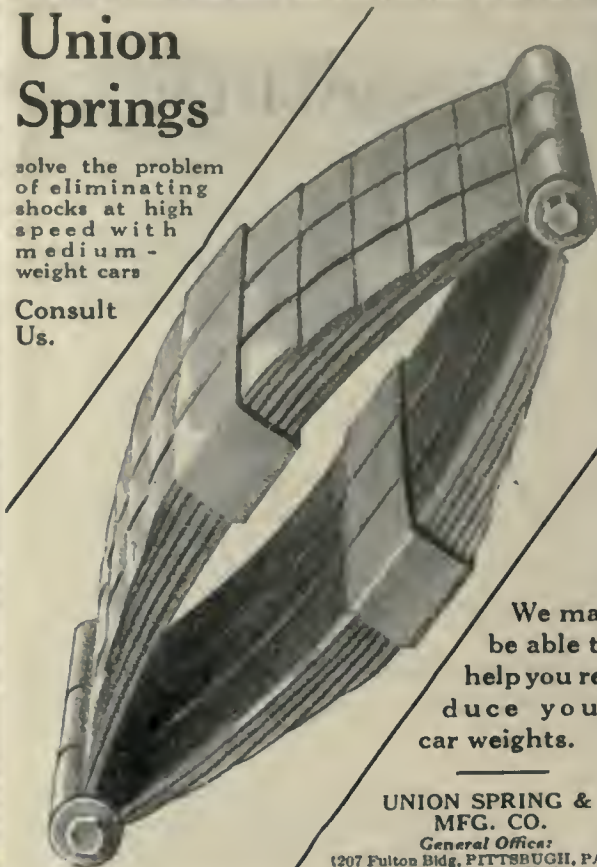
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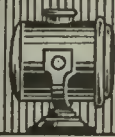
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25 Cycle, 550/600 Volts, D.C.

4—500 KW. Gen. Elec. Rotary Converter, type HC, form K, 600 Volts D.C., 834 amps. D.C., 4 pole, 750 RPM. With each rotary there are three 165 Kva. Gen. Elec. single phase transformers, type OI SC, 6600/5940 V primary, 430/286/143 V. secondary; also suitable switchboards.

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ROTARY CONVERTERS

- 1—300-kw. Westinghouse Rotary Converter, 3-ph., 60-cy., 370-v. A.C., 575-v. D.C., 600 r.p.m.
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CAR BODIES

- 1—70-ft. Steel Combination Passenger Car Body, practically new.
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- 4—Westinghouse No. 305 Motors.
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Direct Current Belted Generator

1—500-kw., 550-V., 320 r.p.m. Cp. Wd. Westinghouse 3 bearing direct current generator.

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Everything in the Line of Repairs to Electrical Machinery

Complete Armatures, New Armatures, Rewound Armature Cores, Armature Shafts, Armature Coils, Fields and Commutators.

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Full Stock, All Weights.

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16,000 tons—with Angle Bars to match. Available immediate shipment and centrally located.

We positively own these Rails and offer same in carload lots and over.

25,000 tons—Relayers—sizes 35 lb. to 100 lb., in stock our Pittsburgh yards and vicinity.

Immediate shipment guaranteed and prices very attractive.

Carload and less than carload inquiries and orders solicited.

Rails cut to length for structural purposes. Frogs, Switches, Bolts, Nuts, Spikes and all Accessories.

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OPEN and CLOSED
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Write for Price and Full
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FOR SALE

One New 500 Kw., 600 volt

Rotary Converter

with a three-panel switchboard, step-down transformer, 13,200 volts primary, 445 volts secondary, 60 cycles, 3 phase, and electrolytic lightning arrester.

Equipment complete.
Immediate shipment.

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FS204—Elec. Ry. Journal,
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SEARCHLIGHT SECTION



NOTICE OF TRUSTEES' SALE

In the United States District Court for the Western District of North Carolina, at Greensboro.

In the matter of

SOUTHERN CAR CO. BANKRUPT

In pursuance of an order to me directed, I will, on the

8th Day of August, 1918 at 2 o'clock

p. m., on the premises of the Southern Car company in the City of High Point, North Carolina, expose to sale at public auction for cash all of the real and personal property belonging to said bankrupt, the personal property consisting of the following:

	Appraisal Value
Machinery (electrical).....	\$9,748.66
Machinery.....	25,907.20
Tools.....	2,301.10
Sundry Supplies.....	4,285.60
Lumber.....	616.60
Shafting and pulleys.....	992.00
Beltting.....	1,077.30
Pipe and fittings.....	1,298.16
Office Furniture & fixtures.....	1,222.00
Supplies.....	8,419.65

and the real estate being more particularly bounded and described as follows:

All those certain lands, pieces or parcels of land, situated, lying and being in the City of High Point, county of Guilford, State of North Carolina, and bounded and more particularly described as follows, to-wit:

Beginning at an iron stake in the center of Southern Railroad's main line track, Rankin Coffin and Casket Co.'s northwest corner; thence along center of said Southern Railroad south 33 degrees, 39 minutes west 411.75 feet to an iron stake in east side of Southern Ave. thence along said Southern Ave. south 51 degrees, 10 minutes east 113.89 feet to an iron stake, southeast corner of said Southern Ave.; thence along Southern Ave. south 38 degrees, 40 minutes west 326.15 feet to an iron stake, corner of Southern Ave.; thence with grove (see blue print) 83 feet, more or less, to an iron stake, corner Southern Ave.; thence along said Southern Ave. south 51 degrees 10 minutes east 136 feet to an iron stake, Southern Power Co.'s northwest corner; thence along line of said Southern Power Co. north 33 degrees, 50 minutes east 109 feet to an iron stake, Southern Power Co.'s northeast corner; thence along the line of said Southern Power Co. south 51 degrees 10 minutes east 174 feet to an iron stake, said Southern Power Co.'s southeast corner; thence along line of said Southern Power Co. south 38 degrees 59 minutes west 179 feet to an iron stake on east side of Southern Ave., Southern Power Co.'s southwest corner; thence along the line of said Southern Ave. south 51 degrees 10 minutes east 259.41 feet to an iron stake, E. H. C. Fields' angle in Hedding St., E. H. C. Fields south 84 degrees 15 minutes east 209 feet to an iron stake, intersection of Hedding St. and Myrtle Ave.; thence along the line of Hedding St., north 45 degrees 39 minutes east 492 feet to an iron stake at angle in Hedding St., E. H. C. Fields' corner north 43 degrees 45 minutes east 203.50 feet to an iron stake said E. H. C. Fields' corner; thence along line of said Fields north 50 degrees 30 minutes west 570.60 feet to an iron stake in Rankin Coffin and Casket Co.'s line thence along line of said Rankin Coffin and Casket Co. south 38 degrees 30 minutes west 18.50 feet to an iron stake Rankin Coffin and Casket Co.'s southwest corner thence along the line of said Rankin Coffin and Casket Co. north 30 degrees west 300 feet to the beginning, containing 14.76 acres more or less.

The terms of sale to be cash on confirmation by the court, said sale to be reported by me at an adjourned meeting to be held on August 9, 1918, the highest bidder to deposit certified check for ten per cent. (10 per cent.) of his bid pending confirmation by the court on August 9th.

This July 1, 1918.

W. A. COPELAND,

Trustee in Bankruptcy of Southern Car Company.

TRUSTEES' SALE— STREET RAILWAY PROPERTY

Notice is hereby given that under and by virtue of that certain decree of sale, made and entered on the 24th day of June, 1918, by the Honorable Rhydon M. Call of the United States District Court for the Southern District of Florida, in Chancery, in that suit therein pending where u Charles M. Allen is complainant and

ST. PETERSBURG & GULF RAILWAY COMPANY

a corporation is defendant, and the undersigned as Trustee under that certain Deed of Trust executed by the said Railway Company on the 1st day of August 1915, as intervenor, the undersigned as such Trustee will sell, at the main office of St. Petersburg & Gulf Railway Company, in the City of St. Petersburg, Florida, on

MONDAY, AUGUST 5th, A.D., 1918

the same being a legal sale day, between the hours of 11 a. m. and 2 p. m., to the highest and best bidder, the property covered by said Deed of Trust and described in said Decree of Sale, to-wit:—

The following Rolling Stock, consisting of seven passenger cars, three work cars, one freight car, seven truck cars.

Also the following Track and Overhead, together with all wires, poles and fixtures, road bed ties, rails franchises, rights of way, or otherwise, used in connection with said track and overhead equipment, as the same is now located over and upon and along the streets and portions of the City of St. Petersburg, Florida, and vicinity, the streets of Gulfport, Florida and vicinity and County Roads of Pinellas County, Florida consisting of 26.55 more or less, miles of track composed of Davista and Drive Line commencing at the intersection of Beach Drive and Central Avenue and extending Westward on Central Avenue to Park Street North and thence north-westward on Park Street north to road leading to Jungle Dock, and thence Westward on said road leading to Jungle Dock to and over said Jungle Dock to the western end thereof; also Gulfport Line commencing at the intersection of Ninth Street South and Central Avenue thence extending Southward on Ninth Street South to Tangerine Avenue, thence Westward on Tangerine Avenue to Davis Boulevard, thence Southward on Davis Boulevard to and over the Gulfport Dock to the southern end thereof; also Bay Road Line (being composed of lines constructed under two leases, one from Bayboro Investment to St. Petersburg Investment Company, and the other from Roy S. Hanna Trustee to St. Petersburg & Gulf Railway Company), the line constructed under the first lease commencing at the intersection of Fifth Street South and Central Avenue, thence extending Southward on Fifth Street South, to 6th Avenue South, thence eastward on Sixth Avenue South to Third Street South, thence Southward on Third Street South to Eleventh Avenue South, and thence Eastward on Eleventh Avenue South to shore of Tampa Bay; and the balance of the line constructed under the lease from Hanna commencing at a point on the last above described course about five hundred feet Westward from the terminus on the shore of Tampa Bay, and thence extending Southward, Southward and again Southward on an irregular course to a point on the westerly shore of Big Bayou; also Seminary and North Ninth Street Line composed partly of the original trackage and partly of trackage under two leases one from C. W. Sprinkstead Trustee to St. Petersburg & Gulf Railway Company, and the other from C. Perry Howell and J. C. Hamlett to St. Petersburg & Gulf Railway Company, the trackage originally constructed commencing at the intersection of Second Street North and Central Avenue, thence Northward on Second Street North to Seventh Avenue North, thence Westward on 7th Avenue North to Ninth Street North, thence Northward — Ninth Street North to a point at or near the intersection of Tenth Street North and Ninth Street North; continuing from the last named intersection and built and operated under the Sprinkstead lease the line runs Northward on Ninth Street North to the intersection of John Pass Road and continuing northward from this point the line was built and is operated under the Howell and Hamlett lease and extends Northward on Ninth Street North to 34th Avenue North, and thence Eastward on 34th Avenue North to the Seminary, being at or near the intersection of Hay Street also Coffee Pot Line commencing at the intersection of Seventeenth Avenue North and Second Street North and extending Eastward on Second Avenue North to and over the municipal pier to the east end thereof, also Beach Drive Line beginning at the intersection of Central Avenue and Beach Drive and extending Northward along Beach Drive to the intersection of Second Avenue North, also Electric Dock Line commencing at the intersection of Beach Drive and westerly boundary line of Water lot No. 4 according to revised map of the City of St. Petersburg, and thence extending eastward over water lot No. 4 and the electric dock constructed thereon to the easterly end of said dock; also Sixteenth and Central Avenue Line com-

mencing at the intersection of Central Avenue and Sixteenth Street and thence extending Northward on Sixteenth Street to car barn and lighting plant.

Also the following real estate in Pinellas County, Florida, to-wit: The north one hundred and fifty feet of water lot number four (4) according to revised map or plat of the City of St. Petersburg, as the same is recorded in the office of the Clerk of the Circuit Court of Hillsborough County, together with the riparian properties and rights adjacent and connected with said lot on Tampa Bay, together with warehouse and waiting room.

Also Water Lot No. 1, being a part of or an addition to the revised map of Golf Course and Jungle Subdivision filed for record on December 1, 1916, in plat book No. 4, page 48, public records of Pinellas County, Florida, upon which is constructed what is known as Jungle Dock.

Also water lot number five (5) of Boca Ciega Park Subdivision, being the west two-thirds of government lot number two (2) and lands adjacent, all in Section 33, Township 31 South, Range 16 East, in the town of Gulfport, Florida, known as Gulfport Dock (the said Highway Company has not yet having acquired complete title to said Gulfport Dock and being in possession thereof under contract), together with casino building at Gulfport, Florida.

All that certain tract of land beginning at a point 660.4 feet south and 30 feet east from the Northwest corner of the southwest quarter of the northeast quarter of Section 24, Township 31 South, Range 16 East and run east 150 feet to a point; thence turn 89 degrees 37 minutes to the left and run 87.9 feet to a point; thence turn 88 degrees 38 minutes to the left and run 59.75 feet to a point; thence turn 55 degrees 10 minutes to the right and along the inside edge of a concrete retaining wall 46.82 feet to a point; thence turn 55 degrees 8 minutes to the left and run along the inside edge of said wall 72.7 feet to a point, thence turn 24 degrees 8 minutes to the left and run along the inside edge of said wall 27.4 feet to the intersection of the east line of Sixteenth Street, thence turn 121 degrees 39 minutes to the left and run 203.5 feet along the east line of Sixteenth Street 203.5 feet to point of beginning; known as car barn property, together with the car barn and cement pits.

Also all line department, track, department tools all car barn materials and equipment, all tools on hand at car barn; also fourteen armature cores; also one pair New Bedford Seales and two trucks; also one Hupmobile and one Flanders automobile; one lot of office furniture and fixtures, one electric driven Burroughs Adding Machine; all of the above-said personal property being more particularly and in detail described in the receiver's inventory thereof now on file with the Deputy Clerk of the said Court at Tampa, Florida, and on file with Charles M. Allen, Receiver, at St. Petersburg, Florida, to which inventory reference may be had by intending purchasers.

Together with all licenses, patents, patent rights, processes heretofore owned by said St. Petersburg & Gulf Railway Company on May 3, 1918, at the time the Receiver of said property was appointed, and also all corporate, municipal and other franchises, rights, easements and immunities which the said Railway Company owned at the date of the said Deed of Trust, to-wit: Charles M. Allen, its Trustee, employed on the 3rd day of May 1918, in connection with the aforesaid property; Also all property real and personal, of every nature and kind whatsoever which the said St. Petersburg & Gulf Railway Company owned at the date of the said Deed of Trust, to-wit: Charles M. Allen, its Trustee, employed on the 3rd day of May 1918, in connection with the aforesaid property; Also all property real and personal, of every nature and kind whatsoever which the said St. Petersburg & Gulf Railway Company owned at the date of the said Deed of Trust, to-wit: Charles M. Allen, its Trustee, employed on the 3rd day of May 1918, in connection with the aforesaid property; Also all property real and personal, of every nature and kind whatsoever which the said St. Petersburg & Gulf Railway Company owned at the date of the said Deed of Trust, to-wit: Charles M. Allen, its Trustee, employed on the 3rd day of May 1918, in connection with the aforesaid property.

That said property is being sold by authority of said Trust Deed and of said Decree to satisfy taxes and other governmental liens outstanding against said property, such Receiver's certificates as may have been authorized by said Court, costs and expenses of sale, including a reasonable attorney's fee for the undersigned, and to satisfy \$260,000.00 in bonds outstanding under said Deed of Trust.

The successful bidder at said sale will be required to deposit with the undersigned the sum of \$15,000.00 in the form of a certified check, or otherwise, as indemnity against his bid, in the event that the same should be confirmed by the Court and not may good after confirmation but upon such sale being made the undersigned will duly report the same to the Court, and upon such sale being confirmed by said Court, the undersigned as Trustee, will execute good and sufficient deed or deeds to the purchaser or purchasers of the said property.

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INSURANCE ON LIVES AND
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DOUBLE TRUCK OPEN CARS

- 3—13 Bench Laconia.
3—15 Bench Wason.

*Excellent Condition.
Price Reasonable.*

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10th Ave., at 36th St., New York

60 Tons

7-in Girder Rails

P. S. Co. Section No. 233

HENRY LEVIS & CO.
Commercial Trust Bldg., Philadelphia, Pa.

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15 inches— 2.70 an inch
27 inches— 2.60 an inch
50 inches— 2.55 an inch

Rates for larger spaces furnished on application.

POSITIONS VACANT

ARMATURE winder and electrician, familiar with general maintenance and capable taking care of rolling stock; small road; 12 cars; give experience and salary. Married man preferred. P-198, Elec. Ry. Journal, Chicago.

MEN with technical training or experience wanted for testing and efficiency work in power plants and substations of large electric railway system; good pay for men of adequate qualifications in the field of electric or steam plant equipment; state status with respect to draft. P-208, Elec. Ry. Journal.

MASTER Mechanic and general foreman for maintenance shop of large interurban company in Central West operating high speed cars with Type M control. Attractive salary. P-197, Elec. Ry. Journal, Chicago.

MASTER mechanic wanted by company operating 53 mi. of interurban railway and 9 mi. city railway. State fully experience, age, nationality and give reference. Indiana Railways & Light Company, Kokomo, Indiana.

MASTER mechanic wanted who understands maintenance GE equipment and who can handle men; good salary. P-207, Elec. Ry. Journal, Philadelphia.

NIGHT foreman wanted who understands street railway equipment on road operating 100 cars; good salary to right man. P-211, Elec. Ry. Journal.

Sell your second-hand machinery through
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and get the BEST price for it.

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covering
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This paper covers only one; ask us about the others.

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In a beautiful up-to-date Western New York village with good schools and churches, there is an opening for an experienced Electrician to secure permanent employment on Government work.

This is a particularly splendid opportunity for a man with family of young children who desires for them the benefits of outdoor country life with city advantages.

After a month's work mutually satisfactory to the man and company, moving expenses of family will be paid.

State experience, age, nationality, size of family, wages expected and send character references with first letter.

P205—Elec. Ry. Jour.
10th Ave. at 36th St., New York City

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Address T. U. FAIRLIE
Care of Hydro-Electric Power Commission
of Ontario, Toronto

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ROTARY CONVERTER

One Thousand (1000) kw., 6-phase, 60-cycle, 600-volt.

Also Three (3) 400-kv.-a.

TRANSFORMERS

1-phase, 60-cycle, primary voltage 13,000.
William T. Twomey, 111 W. Monroe St., Chicago

POSITIONS WANTED

CONTROLLER man or wireman desires to make change; can do some armature winding; four years' experience as general shop foreman, good references. PW-210, Elec. Ry. Journal.

MASTER mechanic desires position on medium sized road; can put run down equipment in high grade operating condition. PW-202, Elec. Ry. Journal, Cleveland.

MASTER mechanic of car barn; 16 years' experience; can wind any type of car armatures, run all shop machinery; am first class man on air brakes, either straight or automatic; strictly sober. PW-212, Elec. Ry. Journal, Philadelphia.

TRANSPORTATION—Desire position with street railway company in operating department; 17 years' experience; five years superintendent of transportation in city of 30,000; also interurban line; at present employed, but desire to make change; first class references; 37 years old and married. PW-209, Elec. Ry. Journal, San Francisco.

SUPERINTENDENT OF CONSTRUCTION

seeks opportunity to make change for satisfactory reasons. Thoroughly experienced in track, power house and car barn construction, etc. Reference.

PW 203—Elec. Ry. Journal,
Leader-News Bldg., Cleveland, O.

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Equipment you want

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Ohio Brass Co.
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Ohio Brass Co.

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Brake Shoes.
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St. Louis Car Co.

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Bemis Car Truck Co.
Brill Co., The J. G.

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General Electric Co.
Holden & White, Inc.
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St. Louis Car Co.
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Paxson Co., J. W.
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Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eureka Co.

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General Electric Co.
Jeandron, W. J.
Morgan Crucible Co.
United States Graphite Co.
Westinghouse Elec. & M. Co.

Brushes, Graphite.
United States Graphite Co.

Brackets, Grab.
Beaumont Co., R. H.

Bunkers, Coal.
Beaumont Co., R. H.

Bus Bar Supports.
Philadelphia Electric Company Supply Dept.

Bushings, Case Hardened & Manganese.
Bemis Car Truck Co.

Bushings, Graphite and Wooden.
Bound Brook Oil-less B. Co.

Cables. (See Wires and Cables.)

Cable Bell Ends.
Philadelphia Electric Company Supply Dept.

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Car Equipment. (For Fenders, Hangers, Registers, Wheels, etc.—See those headings.)

Car Trimmings. (For Curtains, Registers, Doors, Seats, etc.—See those headings.)

Cars, Section.
Mudge & Co.

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Horne Mfg. Co.
St. Louis Car Co.
Standard Steel Works Co.
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Ohio Brass Co.
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Westinghouse Elec. & Mfg. Co.

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Westinghouse Elec. & Mfg. Co.

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Samsen Cordage Works
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Van Dorn Coupler Co.
Westinghouse Trac. B. Co.

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National Pneumatic Co.

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McGuire-Cummings Mfg. Co.
St. Louis Car Co.

Recorders, Power Saving.

Arthur Power-Saving Recorder Co

Registers and Fittings.

Bonham Recorder Co.
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The
Rooke Automatic Register Co.
Standard Register Co.

Reinforcement, Concrete.

American Steel & Wire Co.

Relays, Reverse Phase.

Philadelphia Electric Company
Supply Dept.

Repair Shop Appliances. (See also
Coil Banding and Winding
Machines.)

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Electric Service Supplies Co.

Repair Work. (See also Coils.)

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Columbia M. W. & M. I. Co.
General Electric Co.
Independent Lamp & Wire Co.
Westinghouse Elec. & M. Co.

Replacers, Car.

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Reading Specialties Co.

Resistance, Grid.

Columbia M. W. & M. I. Co.

Resistance, Wire and Tube.

General Electric Co.
Westinghouse Elec. & M. Co.

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Rheostats.

General Electric Co.
Westinghouse Elec. & M. Co.

Roofing, Building.

Barrett Co., The
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Standard Paint Co.

Roofing, Car.

Johns-Manville Co., H. W.
Panlasote Co.

Rubber Specialties of All Kinds.

U. S. Rubber Co.

Sanders, Track.

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Cleveland Fare Box Co.
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Ohio Brass Co.
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Signals, Car Starting.

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More-Jones Brass & Metal Co.
Nuttall Co., R. D.

Snow-Plows, Sweepers and Brooms.

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McGuire-Cummings Mfg. Co.

Solderless Connectors.

Westinghouse Elec. & Mfg. Co.

Soldering and Brazing Apparatus.
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Speed, Indicators.

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Spikes.

American Steel & Wire Co.

Spleing Compounds

Johns-Manville Co., H. W.
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U. S. Rubber Co.
Westinghouse Elec. & Mfg. Co.

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American Steel & Wire Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Standard Steel Works Co.
Union Spring & Mfg. Co.

Sprinklers, Track & Road.

Brill Co., The J. G.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.

Steps, Car.

American Mason S. T. Co.
Universal Safety Tread Co.

Stokers, Mechanical.

Babcock & Wilcox Co.
Green Engrg. Co.
Westinghouse Elec. & M. Co.

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Strand

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Straps, Cat, Sanitary.

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Railway Improvement Co.

Structural Iron. (See Bridges.)

Superheaters.

Babcock & Wilcox Co.
Power Specialty Co.

Sweepers, Snow. (See Snow
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Switches (Disconnecting)

Philadelphia Electric Company
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Switches, Lock.

Weiss Switch Lock Co

Switches, Safety.

V. V. Fittings Co.

Switch Stands.

Kilby Frog & Switch Co.
Ramapo Iron Works.

Switches, Track. (See Track, Special Work.)

Switches & Switchboards.

Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Nichols-Lintern Co.
Westinghouse Elec. & M. Co.

Tampers, Tie.

Ingersoll-Band Co.

Tanks, Oil Storage.

Milwaukee Tank Works Co.

Tapes and Cloths. (See Insulating
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Telephones and Parts.

Electric Service Supplies Co.

Terminals, Cable.

Standard Underground Cable Co.

Testing Commercial & Electrical.

Elect Testing Laboratories.

Testing Instruments. (See Instru-
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Testing, etc.)

Thermostats.

Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
Railway Utility Co.
Smith Healer Co., Peter.

Ticket Choppers & Destroyers.

Electric Service Supplies Co.

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Dayton Mechanical Tie Co.

Ties and Tie Rods, Steel.

Barbour-Stockwell Co.
Carnegie Steel Co.
International Steel Tie Co.

Ties, Wood Cross. (See Poles, Ties,
Posts, etc.)

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American Steel & Wire Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Hubbard & Co.
Johns-Manville Co., H. W.
Klein & Sons, Mathias.
Railway Track-work Co.

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McCardell & Co., J. H.

Towers & Transmission Structures.

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Westinghouse Elec. & M. Co.

Track, Special Work.

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Cleveland Frog & Cross, Co.
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Kilby Frog & Switch Co.
New York Switch & Crossing Co.
Ramapo Iron Works.

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Transfer Tables.

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General Electric Co.
Westinghouse Elec. & M. Co.

Treads, Safety, Stairs, Car Steps.

American Mason S. T. Co.
Universal Safety Tread Co.

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National Railway Appliance Co.
Nuttall Co., R. D.
Ohio Brass Co.

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Trolleys & Trolley Systems.

Ford Chain Block & Mfg. Co.

Trolley Shoes.

Holden & White, Inc.
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Trolley Wheels. (See Wheels,
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Trolley Wire

Roebbling Son's Co., John A.



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The question of ability to make delivery is now, more so than in normal times, often the determining factor in placing orders for equipment.

Although our plant and facilities are busily engaged on Government work of various kinds, we have reserved space for car and truck work. Send us your inquiries and avail yourself of the counsel of our staff of car Engineers.

St. Louis Car Company
St. Louis, Mo.

BRAKE SHOES STANDARDIZE

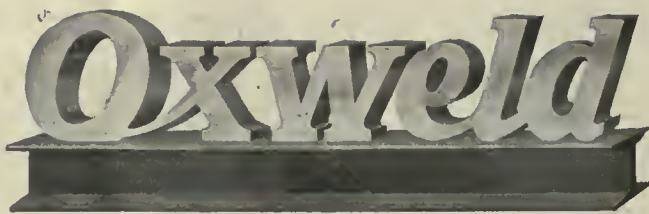
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Reinforced Brake Shoes
Conserve Material, La-
bor, Time and Money—
Ask us.

**American Brake Shoe &
Foundry Co.**

30 Church Street, New York

McCormick Bldg., Chicago.

Chattanooga, Tenn.



Where Pennies Save Dollars

IN EVERY DEPARTMENT of electric railway construction and upkeep—wherever metal is to be cut or joined—wherever repairs are needed—Oxweld equipment yields profitable service. Oxweld apparatus for welding and cutting with the oxy-acetylene flame means a short cut to the best work at the lowest cost.

The Oxweld Injector Type Blowpipe works with constant efficiency on all pressures down to ½ lb. per square inch, and utilizes a far greater proportion of the gas content of a cylinder than does the ordinary blowpipe.

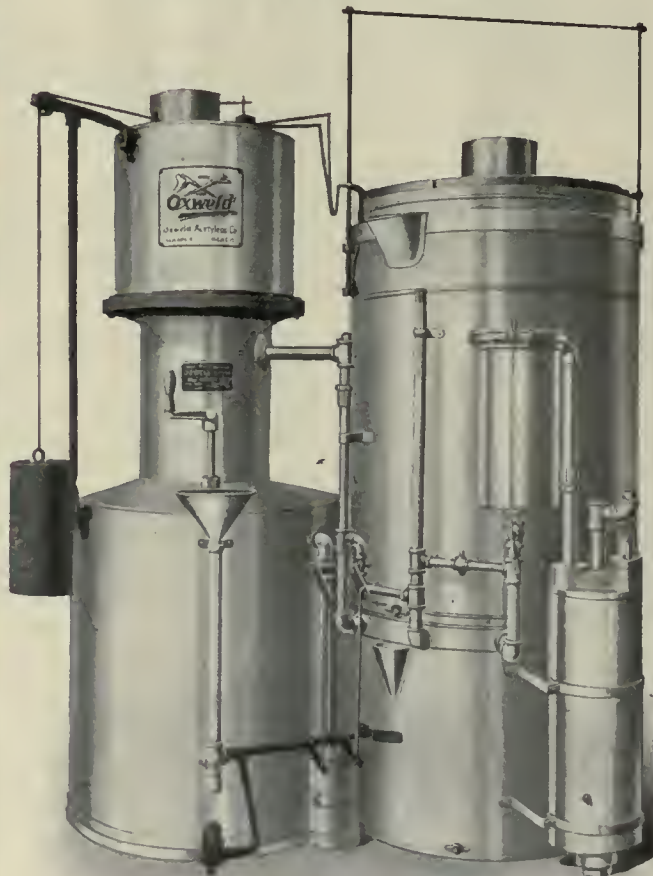
Oxweld Acetylene Generators are preferred where economical supply of gas, dependability, and durability are considered.

Write for Bulletin Series 700

Oxweld Acetylene Company

NEWARK, N. J. CHICAGO LOS ANGELES

*World's Largest Maker of Oxy-Acetylene
Equipment for Welding and Cutting Metals*



Oxweld Low Pressure Acetylene Generator

Trucks, Car.

Bemia Car Truck Co.
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McGuire-Cummings Mfg. Co.
St. Louis Car Co.

Tubing, Steel.

National Tube Co.

Turbines, Steam.

General Electric Co.
Westinghouse Elec. & M. Co.

Turbosties.

Perey Mfg. Co., Inc.

Valves.

Ohio Brass Co.
Westinghouse Traction Brake Co.

Varnishes. (See Paints, etc.)

Ventilators, Car.

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Holden & White, Inc.
National Railway Appliance Co.
Nichols-Lintern Co.
Railway Utility Co.
St. Louis Car Co.

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Bound Brook Oil-less Bearing Co.

Waste Saturation Systems.

Milwaukee Tank Works.

Water Softening and Purifying Systems.

Scaife & Sons Co., Wm. B.

Welders, Electric Arc.

Lincoln Electric Co.

Welders, Portable Electric.

Electric Ry. Improvement Co.

Welding Processes and Apparatus.

Electric Ry. Improvement Co.
General Electric Co.
Imperial Brass Mfg. Co.
Lincoln Electric Co.
Metal & Thermit Corp.
National Ry. Appliance Co.
Oxweld Acetylene Co.
Westinghouse Elec. & M. Co.

Wheel Guards. (See Fenders & Wheel Guards.)

Wheel Presses. (See Machine Tools.)

Wheels, Car, Cast Iron.

Bemia Car Truck Co.
Griffin Wheel Co.

Wheels, Car, Steel and Steel Tired.

Bemia Car Truck Co.
Carnegie Steel Co.
Standard Steel Works Co.

Wheels, Trolley.

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Nuttall Co., R. D.
Star Brass Works.

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Wires and Cables.

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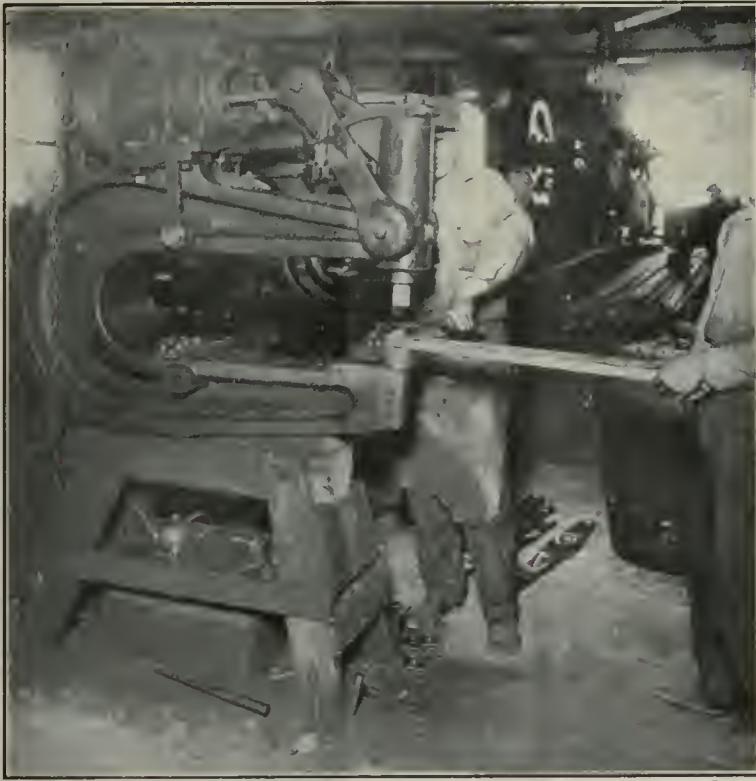
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Columbia Brake Levers

No. 6—*Reaming and Bushing*

THE last steps in the making of a Columbia brake lever are reaming and bushing. Reaming assures a clean, smooth hole and the exact diameter.

The bushings inserted in the reamed holes will stay firm and wear long—

Like all of the Columbians listed below

Columbia Machine Works & Malleable Iron Co.

Atlantic Ave. and Chestnut St.

Brooklyn, N. Y.

W. R. Kerschner Co., Inc., N. Y.
Holden & White, Inc., Chicago
F. F. Bodler, San Francisco
Railway & Power Eng. Corp., Ltd., Toronto, Ont.

TOOLS

Armature and Axle Straighteners
Armature shaft straighteners
Armature buggies and stands
Babbiting molds
Banding and heading machines
Car hoists
Car replacers
Coil taping machines for armature leads
Coil winding machines
Pinion pullers
Pit jacks
Signal or target switches
Tension stands



CAR EQUIPMENT

Armature and Axle Bearings
Armature and field coils
Bearings (Axle and Armature)
Brush-holders and brush-holder springs
Brake, door and other handles
Brake forgings, riggings, etc.
Car trimmings
Commutators
Controller handles
Forgings of all kinds
Gear cases (steel or mall. iron)
Grid resistors
Third-rail shoe beams and accessories
Trolley poles (steel) and wheels



Collier Service

at Dallas

Dallas is the headquarters of Collier Service for the Lone Star State; and the standards followed there are on the same high plane that characterize Collier Service everywhere.

One of those standards is the character of the car cards.

Every card is carefully scrutinized so that the important characteristic points are forcefully conveyed to the car rider—whether the advertisement relates to men's fashions, to furniture, to candy, to moving pictures, or to any of the many other subjects advertised.

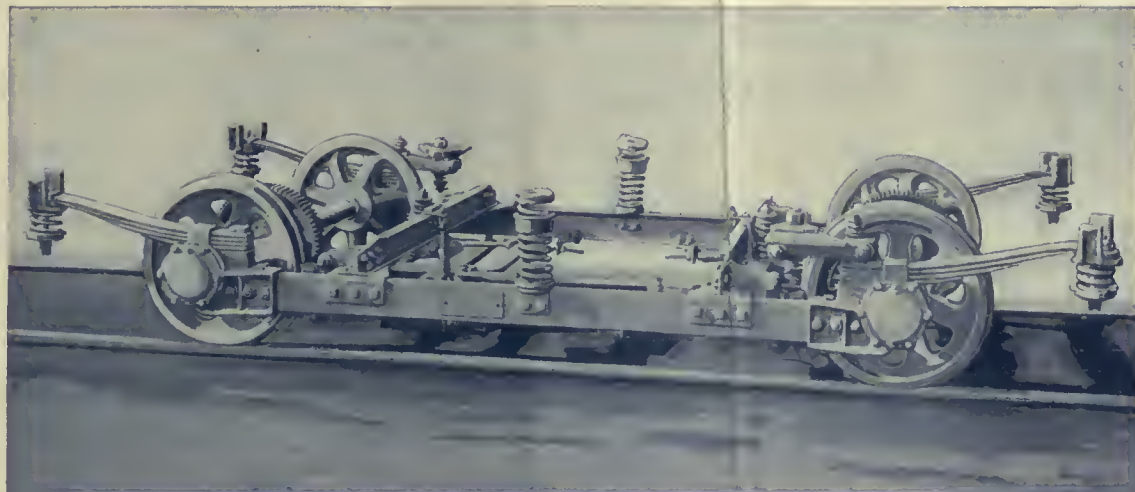
It is only by the exercise of such discrimination that car card advertising has earned the confidence of the riding public; and by earning that confidence has made it possible for electric railways to enjoy a regular income from this source of revenue.

Barron G. Collier
INCORPORATED

Candler Building

220 West 42nd Street, New York City

THE SAFETY CAR TRUCK



THE Brill 78-M Truck was specified for the 35 Birney Safety Cars recently ordered by the Southern Pacific Company, 20 of which are for use in Los Angeles. This truck was expressly designed for the Safety Car to correspond with its light weight and weighs, with wheels and axles, only 3300 lb. The large reduction in weight was gained by putting practically all the load on the end springs and bolting the quarter-elliptics to the journal boxes, thus avoiding the necessity of having the usual heavy frame. Mounting the car on quick acting spiral springs, link suspended from the ends of slower acting quarter-elliptics, completely cushions it against all kinds of vibrations and jolts. A link device, which works on the same principle as the bolster guide of Brill pivotal trucks, permits and controls side easement at curves. Send for a copy of Bulletin 234 and become better acquainted with the 78-M, the Standard Safety Car Truck and one of the most important trucks of modern times.

J. G. BRILL COMPANY
PHILADELPHIA, PA.

G. C. KUHLMAN CAR CO.
CLEVELAND, OHIO



AMERICAN CAR COMPANY
ST. LOUIS, MO.

WASON MANUFACTURING CO.
SPRINGFIELD, MASS.

Automatically Controlled Railway Substation

Three years ago the General Electric Company developed and installed the first automatically controlled substation for railway service. Since that time fifty equipments have been sold in capacities ranging from 200 kw. to 1500 kw.



General Electric Company

ELECTRIC RAILWAY JOURNAL

July 27, 1918

SKF



The officials of the International Railway Company, Buffalo, know that the General Electric No. 258 Motors on their cars will run satisfactorily without constant attention, because these motors are SKF equipped.





Public Appreciation

"I was especially pleased," said the President to the General Manager, "to present to our Board, yesterday, your plans for providing better service, and saving coal, next winter." If it could be financed, the Board would prefer to retire all our old motors, but under present conditions, 100 new motors was the best we could do. As I understand it, in addition to giving the remaining old-type motors a general over-hauling, you are going to provide them with covers, so as to prevent trouble from snow and water."

"Joe, our Superintendent, is going right ahead with the entire program," answered the General Manager. "We expect to give good service from now on. The big problem before us is to get the public to appreciate it, and the Utility Commission to grant reasonable fare increases."

"That, of course, has always been our greatest problem," remarked the President. "However, in my judgment, there is a very favorable sentiment developing rapidly at the present time, in the minds of the people towards public utilities. I am very glad the A. E. R. A. are going to have a convention in October. I happen to know many of the things the Association War Board has accomplished in aiding the Government, and cleaning up many mistaken ideas that have prevailed in the minds of public authorities regarding the Electric Railway Industry. The whole situation looks most encouraging."

Westinghouse Electric

*Sales Offices in
All Large American Cities*



& Manufacturing Co.

**East Pittsburgh,
PENNSYLVANIA**

Electric Railway Journal

H. W. BLAKE, *Editor*

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Spies and Lies

German agents are everywhere, eager to gather scraps of news about our men, our ships, our munitions. It is still possible to get such information through to Germany, where thousands of these fragments—often individually harmless—are patiently pieced together into a whole which spells death to American soldiers and danger to American homes.

But while the enemy is most industrious in trying to collect information, and his systems elaborate, he is *not* superhuman—indeed he is often very stupid, and would fail to get what he wants were it not deliberately handed to him by the carelessness of loyal Americans.

Do not discuss in public, or with strangers, any news of troop and transport movements, of bits of gossip as to our military preparations, which come into your possession.

Do not permit your friends in service to tell you—or write you—"inside" facts about where they are, what they are doing and seeing,

Do not become a tool of the Hun by passing on the malicious, disheartening rumors which he so eagerly sows. Remember he asks no better service than to have you spread his lies of disasters to our soldiers and sailors, gross scandals in the Red Cross, cruelties, neglect and wholesale executions in our camps, drunkenness and vice in the Expeditionary Force, and other tales certain to disturb American patriots and to bring anxiety and grief to American parents.

And do not wait until you catch someone putting a bomb under a factory. Report the man who spreads pessimistic stories, divulges—or seeks—confidential military information, cries for peace, or belittles our efforts to win the war.

Send the names of such persons, even if they are in uniform, to the Department of Justice, Washington. Give all the details you can, with names of witnesses if possible—show the Hun that we can beat him at his own game of collecting scattered information and putting it to work. The fact that you made the report will not become public.

You are in contact with the enemy *today*, just as truly as if you faced him across No Man's Land. In your hands are two powerful weapons with which to meet him—discretion and vigilance. *Use them.*

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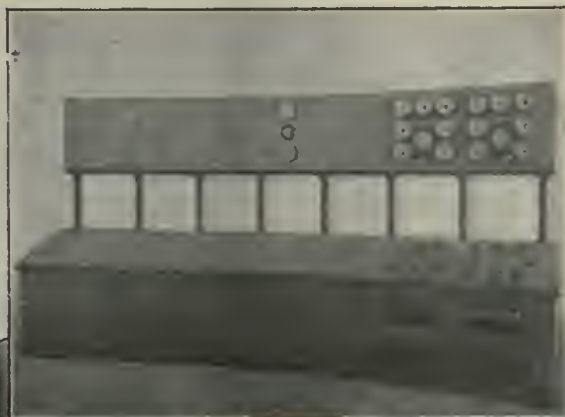
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Westinghouse Air Brake Company, Pittsburgh, Pa.

Switchboard Equipment Of The Dayton Power & Light Co's. New Miller's Ford Generating Station

Part of the complete Westinghouse Switch Gear of this fine station is shown in the illustrations.



Initial capacity 31,250 kv.-a., 66,000-volt, 3-phase, 60-cycle. Ultimate generating capacity, 125,000 kv.-a.

This Station

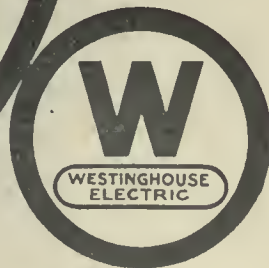
built under the engineering supervision of Thos. E. Murray, Consulting Engineer, is an excellent example of modern switch gear. The present panel equipment is for control of the initial station equipment. Blank panels are provided for future additions.

Included are a 7-section, curved generator control desk, (Fig. 1); a 10-panel, curved feeder board (Fig. 2); an 8-panel curved exciter and voltage regulator board (Fig. 3); a 3-panel meter and battery board; and six 2000-ampere Type 0-2, thirteen 600-ampere Type E-6, sixteen 1200-ampere Type E-8 Oil Circuit Breakers, all solenoid operated.

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Westinghouse

Phono-Electric

The Ideal Wire for Live Suburban Lines



A live suburban line is the ideal place for Phono-Electric trolley wire.

As traffic on such a line is constantly increasing, it is highly desirable that the original current-carrying capacity of the trolley wire be sufficient for years to come.

If a copper wire is installed, the loss, because of wear, will be very rapid, and breaks of the weakened wire will be frequent, too.

Not so with Phono-Electric—it is so tough that ordinary suburban service will cause hardly any wear or loss of conductivity.

And, of course, there will be no breaks!

Bridgeport Brass Company
Bridgeport **Connecticut**



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Quality First



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O-B LOCK HANGERS

For True Line Economy

O-B Lock Hangers do everything the regular hanger does and then go farther. They make every ear seat solidly.

The illustration shows their construction. The ear is turned up until it touches the metal bearing surface at the bottom of the hanger. Then it is tightened still further until it aligns with wire, pulling the stud down in opposition to the spring washer.

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Your investment in them comes back to you—like money in a good savings bank—with compound interest.

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With cost of track construction in the neighborhood of Forty Thousand Dollars a mile, any means that will add years to the life of that construction means a big saving. And the use of Reciprocating Grinders adds those years of useful life.

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In other words, every cupped joint or corrugation which is not promptly cured breaks up the foundation, throws track out of alignment and compels finally a considerable maintenance expense, which would not be necessary if the bad spot were ground out during its incipient stage.

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INTERNATIONAL STEEL TWIN TIES

Obviate this wasted material and labor

Of What Engineering Value Is the Concrete or Ballast Between Wooden Ties? Absolutely None. It Represents an Economic Loss of Track Material and Labor.

Steel Twin Ties are designed to overcome just that condition. The effective tie bearing area is placed at the top of the tie and parallel with the rail.

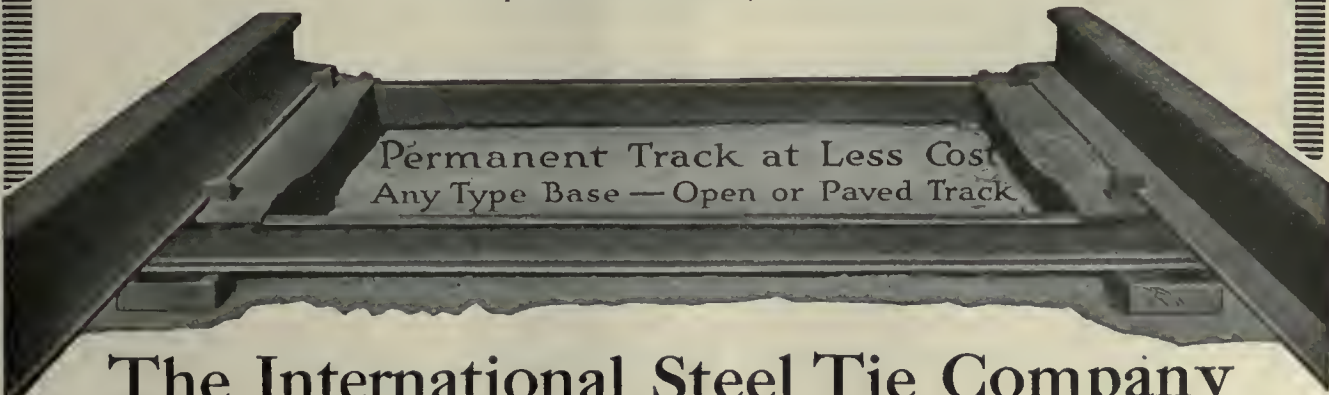
There is an engineering reason for every ounce of metal in a Steel Twin Tie. The 13 in. x 36 in. trussed plates carry the track loads and the 3 in. channels serve as anchorages and tie rods.

Several inches of concrete beneath the tie plate puts just that much in effective bearing. An inch more than is usually used. And at the same time the excavation and concrete quantities below base of rail are reduced one-half.

Any way you look at them they are engineeringly right. The longer you delay your purchase of some of these ties the more money you waste in extraneous track materials and labor.

Ask our users if you want our best sales argument. If you are convinced ask us for a quotation and delivery.

Prompt deliveries made from stock.



Permanent Track at Less Cost
Any Type Base — Open or Paved Track

The International Steel Tie Company

Manufacturers of Steel Twin Ties and Crossing Foundations

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BETTER TRACKS at Less Cost

Can Be Laid

by using
D.M. Ties all
the way!

**Permanent—
Resilient—
Economical**



Are the Result

of careful
construction.

And the best and most
careful method known
so far is that of using
D.M. Ties.

And these
Ties have
Made Good
with a ven-
geance.

Dayton Mechanical Railway Ties are not only a **theoretical** solution of track troubles. They are the **practical** outcome of years of work and tests on track carrying both city and heavy, high-speed, interurban cars.

Write for full
particulars.



THE DAYTON MECHANICAL TIE CO.
201 Third Street Arcade
DAYTON, OHIO





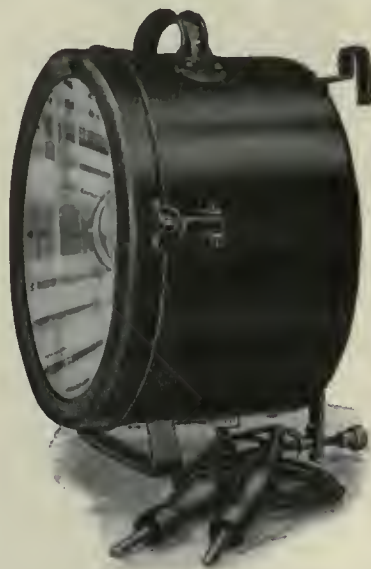
“Golden Glow” Headlights Light up the Way to Willow Grove—Philadelphia’s Famous Resort

Almost every night throughout the Summer these “Willow Grove” cars will operate at full capacity, at high speed and with short headway through the rural section between Philadelphia and Willow Grove.

Their “Golden Glow” Headlights will project steady, powerful beams of golden light. These golden beams will light up the road-bed ‘way ahead, provide an effective warning when approaching grade-crossings and add in many ways to the safety of the thousands of patrons who will visit this resort.

The Philadelphia Rapid Transit Co. were quick to realize the importance of “Golden Glow” Headlights on this most popular interurban branch.

You, too, should use “Golden Glow” with their famous reflectors.



ELECTRIC SERVICE SUPPLIES Co.

Manufacturer of Railway Material and Electrical Supplies

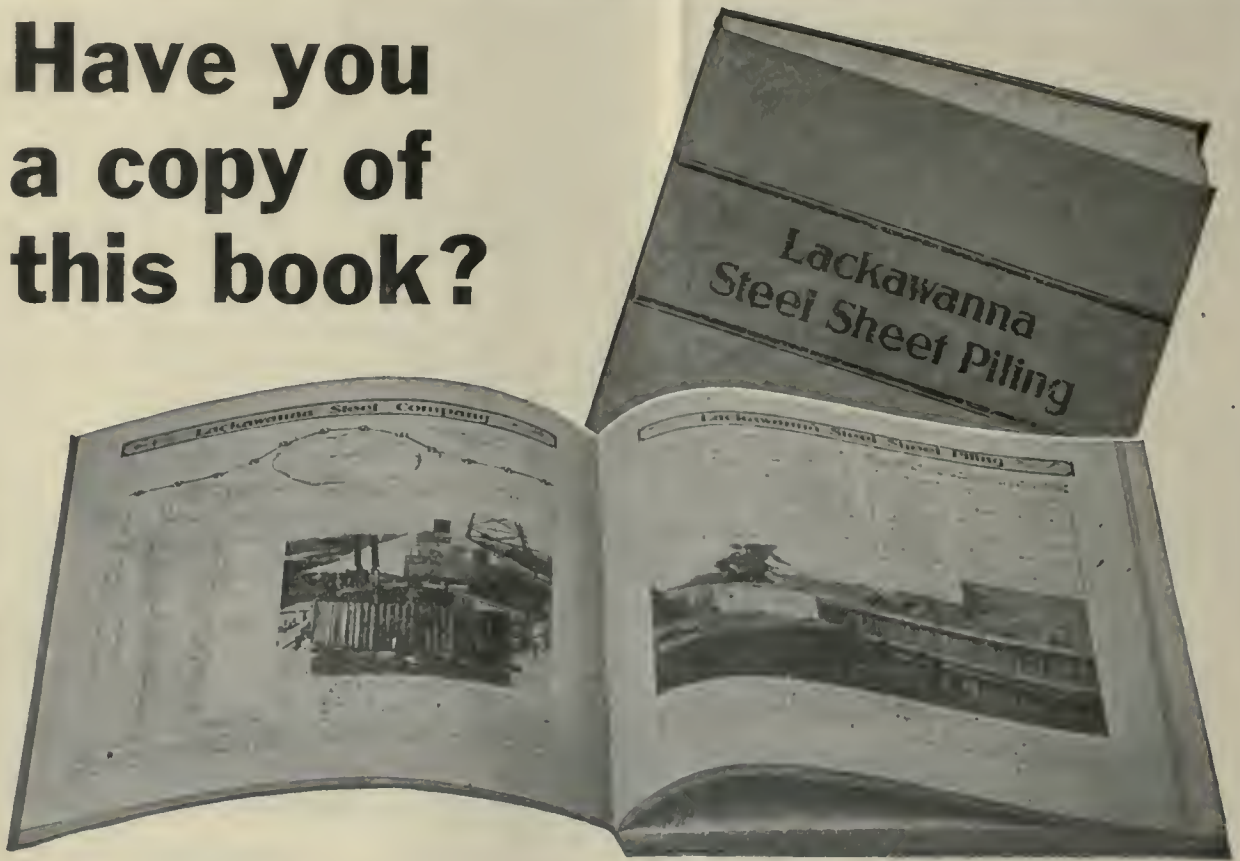
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Have you a copy of this book?



Some Subjects Which Its Pages Cover.

How best to protect adjoining property from adjacent deeper excavation.

How best to treat difficulties in steel sheet piling wall construction when irregular places or sunken obstructions are encountered.

How to keep water out.

How or why steel sheet piling is most economical. Sizes, weights and mathematical properties are given for an economical section of type of steel sheet piling.

What is the best method and rig for driving under special conditions.

How to assure water-tightness at steel sheet piling joints.

How long steel sheet piling may be driven to advantage.

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How best to pull and recover temporarily installed steel sheet piling.

How permanent installations can be made practically proof against corrosion.

THIS text book, although *not* just off the press, is occasionally featured in one of our advertisements, because many otherwise well-informed engineers and managers do not know what a comprehensive, reliable and handy reference book on Steel Sheet Piling is theirs for the asking—and how thoroughly we have anticipated their questions and needs.

The discussion of subjects indicated at the left points out important economies and possibilities, but the book is only an index to Lackawanna Service, which includes personal advice, and if desirable, elaborate tentative designs and suggestions for execution.

Remember, too, that our friendly interest lasts throughout every installation, and even goes so far as to loan a pulling grip for the removal of sheet piling that has served its purpose.

If you are a consulting, designing or managing engineer, send for this book and tell us how and when we can help you.

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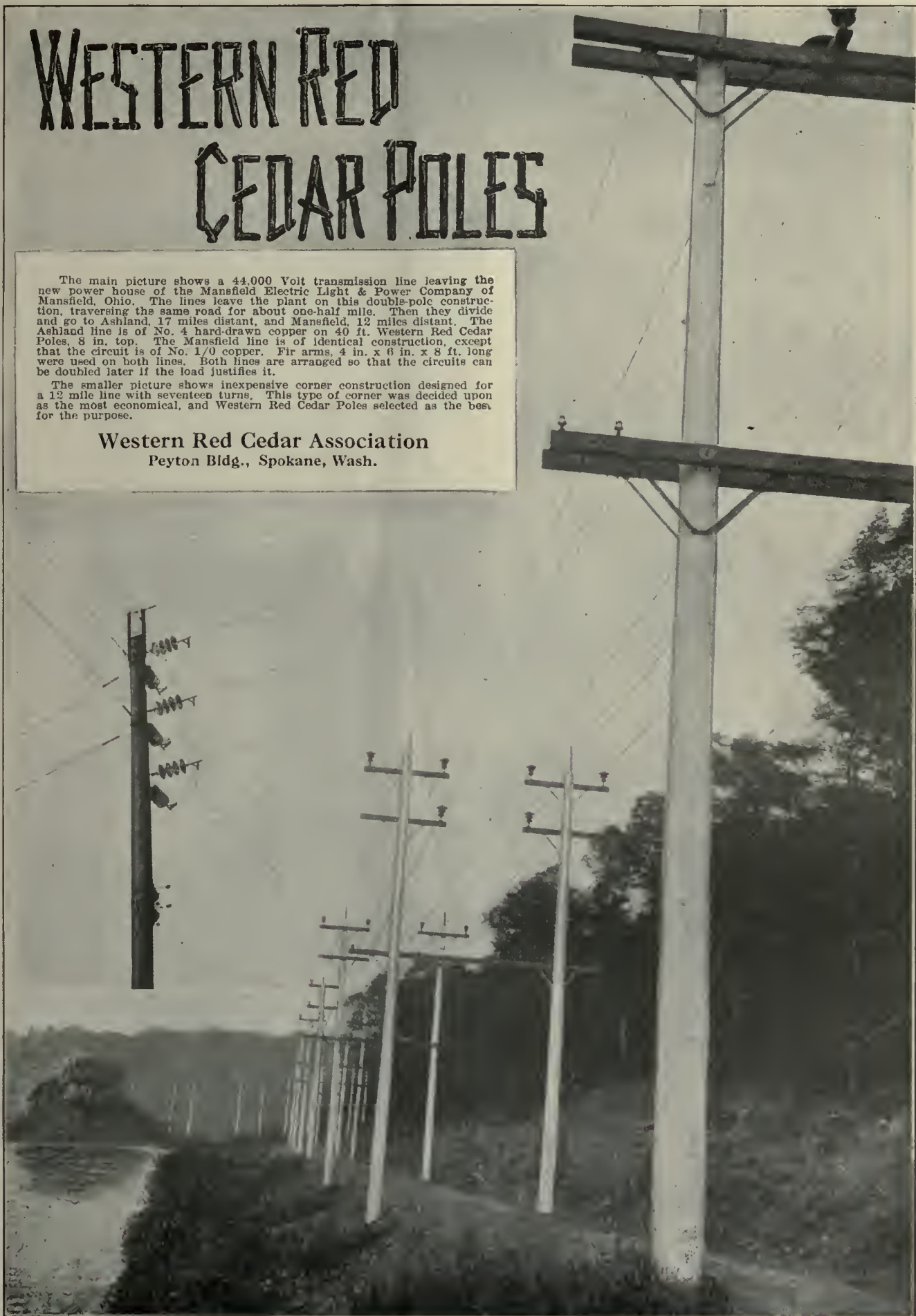
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WESTERN RED CEDAR POLES

The main picture shows a 44,000 Volt transmission line leaving the new power house of the Mansfield Electric Light & Power Company of Mansfield, Ohio. The lines leave the plant on this double-pole construction, traversing the same road for about one-half mile. Then they divide and go to Ashland, 17 miles distant, and Mansfield, 12 miles distant. The Ashland line is of No. 4 hard-drawn copper on 40 ft. Western Red Cedar Poles, 8 in. top. The Mansfield line is of identical construction, except that the circuit is of No. 1/0 copper. Fir arms, 4 in. x 6 in. x 8 ft. long were used on both lines. Both lines are arranged so that the circuits can be doubled later if the load justifies it.

The smaller picture shows inexpensive corner construction designed for a 12 mile line with seventeen turns. This type of corner was decided upon as the most economical, and Western Red Cedar Poles selected as the best for the purpose.

Western Red Cedar Association
Peyton Bldg., Spokane, Wash.

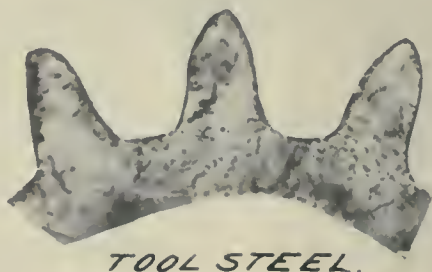


Keeping Records Up to Date

(A test on an imitation pinion of the 1917 Class.)

The following shows a record of test on "Tool Steel" vs. a widely advertised pinion hardened by a case-hardening process—claimed to be "as good as Tool Steel"—selling for about the same price.

"Tool Steel" Pinion
on Motor No. 1



Imitation Pinion
on Motor No. 2



Same Car, Same Mileage, both started with new soft gears.

Ratio of Wear, 1 to 2.7 Favor "Tool Steel"

also

The imitation pinion caused its gear to wear considerably faster than the gear mated with "Tool Steel."

Have You Made Comparative Tests for Quality?

*If you have, it's dollars to doughnuts you've
standardized on our gears.*

THE TOOL STEEL GEAR AND PINION CO.
CINCINNATI, OHIO

Broadway's Car Cashiers

(A Composite Interview)



When they first asked me how would I like to be collecting fares on the street car, I said I wouldn't like it a bit.

But when I took a ride on what they used to call the hobble-skirt cars, I changed my mind. That's a woman's privilege, you know.

Why, it's just lovely. No bell cords too high for a short girl like me; and a seat that makes some of the passengers call me "The bird in a gilded cage."

But the easiest part of the job is the opening and closing of the doors. Not a thing to do but just tap a little thingumajig with my foot—and another thingumajig called a door engine does the rest.

Transfer, sir?



*Ask the girls,
they know*

**NATIONAL
PNEUMATIC
DOOR AND
STEP
CONTROL**

NATIONAL PNEUMATIC COMPANY
INC.

50 Church St. New York



515 Laflin St. Chicago



The MILLER Trolley Shoe

The best and last word in current collection at minimum wheel and wire cost

Hardly a year has gone by since the Miller Trolley Shoe was placed on the market to demonstrate that the principle of sliding contact so successfully used abroad—and adopted in the pantograph form for the *heaviest* work in this country—could also be adapted for

Use with Existing Trolley Poles and Bases

Today hundreds of cars on scores of railways of every character of service are using the Miller Trolley Shoe—and using it successfully through making such changes as lowering the trolley base tension and instructing platform men how to operate under special work and to back up.

Whenever the principle of the Miller Trolley Shoe has been correctly applied and fairly followed up, the user reports a life far in excess of the trolley wheel and a wire-wear that is less than it would be with a higher tension contact that does not *hug the trolley wire as tenaciously as the Miller Trolley Shoe.*



Among the many important benefits of sliding contact obtained by means of the Miller Shoe, are the following:

No smash down of overhead and consequent breakage of trolley wire—

No arcing at spans or burning of trolley wire—

No limitation on the use of composition or steel contact wire trolley—

No bent trolley poles or bruised car roofs; and

NO TRAFFIC INTERRUPTION DUE TO DEWIREMENTS

Miller Trolley Shoe Co., West Newton, Mass.

SPECIAL REPRESENTATIVE: Holden & White, Inc., Chicago

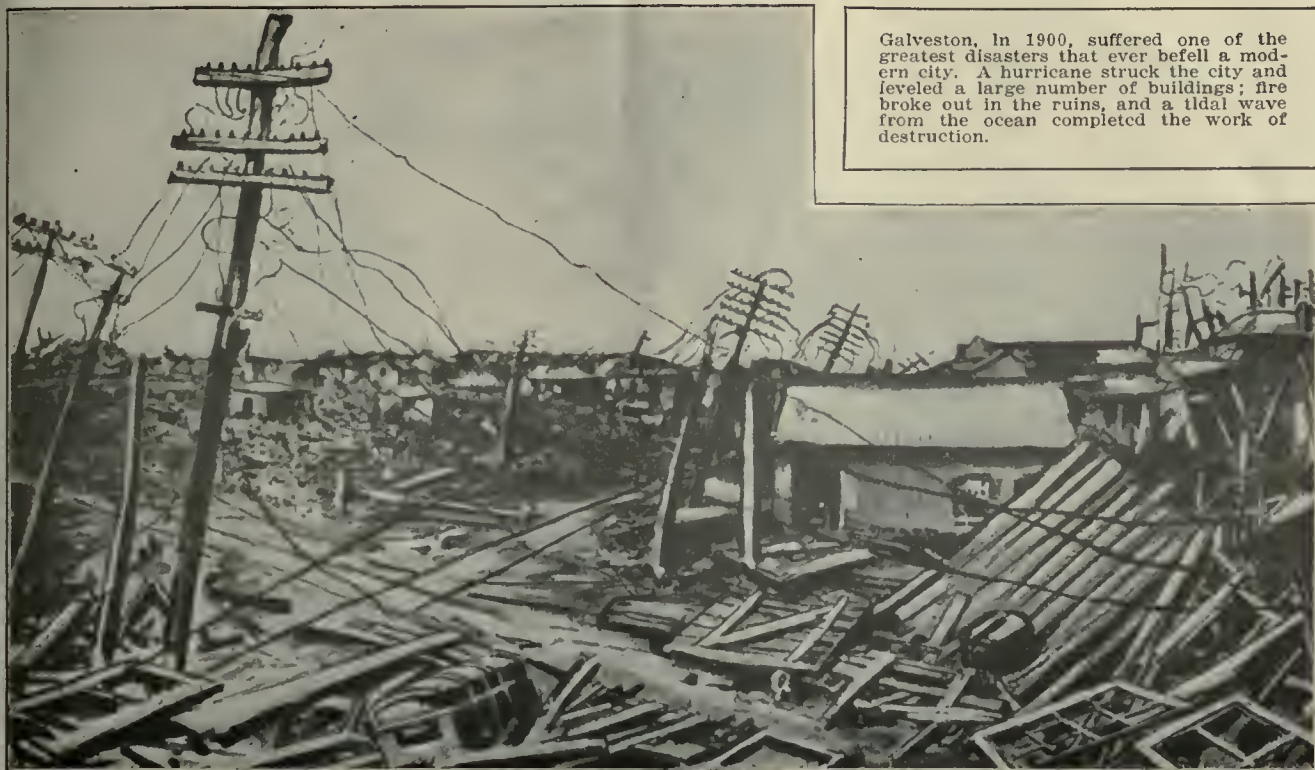
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Galveston, in 1900, suffered one of the greatest disasters that ever befell a modern city. A hurricane struck the city and leveled a large number of buildings; fire broke out in the ruins, and a tidal wave from the ocean completed the work of destruction.

The Galveston Hurricane

reduced a thriving city to ruins; it killed more than 5,000 people; it destroyed the fruits of a century of hard work—but it could not destroy the courage and brave spirit of its citizens. From the ruins there rose a new and greater Galveston, a city which in the short span of 18 years has reached a commercial importance second only to New Orleans on the Mexican Gulf.

Its wide, level streets show striking evidence of well-planned rebuilding.

Its street car system is second to none for cities of its size.

The high speed line from Galveston to Houston (50 miles) is a direct continuation of the Galveston City lines with 39 miles of track and operated by the same interests.

Galena Oils

have also come through the trials of adversity with flying colors. For almost 50 years they have helped maintain steam and electric railroad operation at its highest efficiency.

Galena-Signal Oil Co.
Franklin, Pa.



That's Logical, Isn't It?

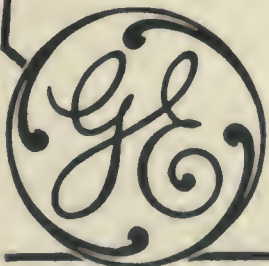
What would it mean to you in dollars saved in a year if you were using

G-E Renewable Pan Frogs

Just think what this means as a time saver in cases of emergency.

No tackle necessary—simply loosen two bolts—unclinch the ends—slap on a new pan—tighten the bolts—clinch the ends and the line is ready for service—all done in two minutes.

Better consider them.



40-7

GENERAL ELECTRIC COMPANY

General Office, Schenectady N.Y.

Sales Offices in all large cities

Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

Volume 52

New York, Saturday, July 27, 1918

Number 4

C. E. R. A. Shows Resourcefulness at Cedar Point Meeting

UNUSUAL interest attaches to meetings held during war-time, such as the recent summer meeting of the Central Electric Railway Association, on account of the difficulty of securing speakers and attendants, and of the responsibility laid by circumstances upon those in charge of the programs to see that each item has a bearing upon the winning of the war. The meeting held at Cedar Point, Ohio, by the C. E. R. A. was in part an outing and in part a conference for the discussion of pressing matters. It took the place of the boat ride which has come during the last few years to be a conspicuous feature of the year's activities. The outing in itself was excuse enough for the meeting, because, as more than one speaker forcibly pointed out, it is more important than ever for men engaged in the transportation business to foster personal acquaintance as a means of facilitating interchange of ideas and information. But the program of talks on timely subjects was a real success, in spite of the fact that it bore little relation to the printed schedule. The result was so striking that a suggestion was made to the effect that the same procedure be followed in future meetings. Of course, this could not literally be done, as it is very important that at least part of a program involve careful and adequate preparation. There is a lesson in it, however, namely, that a meeting thrown upon its own resources can instruct as well as entertain itself. In war-time it may be necessary to utilize this fact more and more, and in planning programs it will be well to have in reserve a number of semi-impromptu talks by experts who will explain in non-technical language the latest developments in their several lines of work.

Has the Three-Cent Rate on Steam Roads Affected Interurban Passenger Traffic?

THOUGH the straight 3-cent rate recently put in force on steam roads by the order of the Director-General of the federalized railways has been in force only a short time, some idea of the trend of its effect on interurban passenger earnings can now be gained, although quantitative figures are not yet available. This trend as indicated by a recent brief survey is about as follows:

On those roads where the steam road competition was practically negligible and in great industrial districts where electric railway equipment was already being operated practically up to the limit of its passenger-carrying capacity the gains in traffic are, of course, negligible. On those lines which parallel steam roads through the great agriculture belts the gains are slight,

since in these districts local traffic has largely been destroyed by automobile competition and the long-distance traffic is light. The greatest gains seem to have been made by those roads operating into large city terminals. On some of these roads for hauls ranging from 15 to 75 miles in length the gain has been noticeable.

On the whole, however, the gain has not been at all sufficient to justify the statement made by a member of the public utilities commission in one of the states containing a large interurban mileage who is quoted as recently saying to electric railway operators in connection with an increased fare petition: "Now is the time to fill your cars." As a matter of fact, the present indications bear out the advice of the War Board recently quoted in these columns that this is no time for hopes of profitable competition with the steam roads, or, to get down to bed rock in the matter, competition with the government. There are far greater possibilities in increased income from higher rates of fare than from any increase in traffic taken over from the steam roads as a result of their 3-cent fare rate.

You Cannot Indict an Entire Industry

"I DO NOT KNOW the method of drawing up an indictment against a whole people," said Edmund Burke in his famous speech on conciliation with the American colonies. Similarly we do not know how to, and we do not think it proper to, indict a whole industry.

The electric railway industry is on the threshold of great, of revolutionary changes. Already in many cities the long-headway, two-men heavy car is being replaced by the short-headway, one-man light car and the industry's price for a generation—the 5-cent flat fare regardless of distance—is in a state of rapid dissolution.

But as electric railways endeavor to make these changes, they are likely to be told that they must have been a lot of blithering idiots not to have done these things before. Is this true?

One answer to such a blanket indictment must stress the fact that the founders of electric railways were not permitted by the public sentiment of their time to charge higher fares because almost every franchise had an ironclad stipulation for a 5-cent fare. Another answer must bring out the fact that the more economical one-man car with automatic devices was not developed until a late period because of public opposition to be traced back to bobtail horse-car days. A third answer is found in the fact that the past generation knew nothing and cared nothing about

"depreciation," "obsolescence," "service-at-cost" and other things that now make the electric railway man's life a busy nightmare.

It is easy to criticise the operators of a private corporation for the mistakes and failings of their predecessors, but who would dream of criticising the present officials of a municipal corporation for what was done by mayor and aldermen 'way back in '89? Why not give the private corporation official an equally fair start for character and probity?

No doubt many operators have failed to take advantage of changed conditions, particularly in acting on the principle that the electric railway is no longer a monopoly—but give them a chance, ye Mayors, Councillors and Commissioners! They often know what ought to be done but need just a bit of encouragement from you to put it over!

A Large Working Force Turnover Causes Disorganization

A MAN cannot step into a new position, be it that of manager or waterboy, and develop his normal work output the first day. It takes some time for him to determine the exact nature of his duties and to become accustomed to his working conditions and the local routine. Not only is he inefficient himself during his "breaking-in" period, but by reason of the fact that he must receive his instruction from others, the output of his fellow workers is also affected. Obviously, different classes of work call for training periods of different lengths and the experienced hand creates less confusion than the green one. But no matter what the line of work or what the experience of the men involved, a large working force turnover is a fruitful cause of disorganization and makes the maintenance of discipline difficult. This problem is a serious one with the electric railway industry to-day since upon the maintenance of organization and discipline depends the safety of their patrons as well as the mere ability to move cars over rails.

What are the causes of the unsettled employment conditions? We would naturally expect military conditions to be the chief cause where the men concerned are of draft age. But the turnover is not by any means the direct result of large numbers of young men entering the military or naval services. It also is large with old, experienced men both of the salaried and working classes. The high wages and salaries now being offered in other fields of endeavor are the main cause of unsettled conditions among these men. Yet by all means they should be retained in the industry. They can be retained only if the compensation which they receive is commensurate with their training and experience, the continuity of employment which exists on an electric railway being considered as one part of their compensation, and if their working conditions approximate those in other lines of work. No more inspiring illustration of the "lure of the rail" can be found than the devotion of our experienced railway men to their work despite the higher pay and easier working conditions outside. But the "lure" cannot be expected to maintain its attraction indefinitely, nor can the wages of electric railway trainmen be paid out of an empty purse.

Make Better Use of Claim Agents in Public Relations Work

THE operating head of a certain electric railway system recently called the claim agent into his office and said in effect: "My idea is that a claim agent should be a hard, unyielding sort of fellow who knows how to bluff and who cannot be bluffed. There is no place in a claim office for good fellows. Their work is dirty work, and they may as well realize it."

Could anything be more absurd? This operator may be a good engineer, but his ignorance of public relations is both broad and comprehensive. There are few electric railway employees who can be of greater service in public relations work than the members of the claim department.

The claim department policy is of the utmost importance. If the operating head thinks that every claimant is a thug and a thief, the claim agents who carry out his policy certainly cannot be makers of friends. On the other hand, if the company makes it known that it takes every possible precaution to prevent accidents and that it is always ready and willing to treat fairly those who have suffered through its fault, the public will in time treat the road fairly.

The traveling public is not made up of people who look upon a transportation company as legitimate prey. The public is made up of average men and women who respond to fair treatment and kindness when they receive them and who are just human enough to respond with harsh treatment and meanness when they are treated in such a manner by company representatives.

For the sake of a few dollars, no railway is big enough to be able to afford making an enemy. Money paid out to satisfy unjust claims is money that is gone. The settlement ends the matter financially. But an enemy made by saving a few dollars is a persistent liability that grows greater with time. Indeed, a miserly attitude in a claim department creates enmities that cost small fortunes later on. One time a claim agent boasted that he had saved \$20 by bluffing a workman who was not clever enough to hold out for what the claim agent would have been willing to pay. Later that workman was on a jury in an important case, and his influence was sufficient to swing the verdict against the company for \$10,000. Does it pay to save at the spigot and waste at the bung-hole?

All claim agents should be instructed in the art of making friends. They should treat every person with whom they have dealings squarely and fairly. Like salesmen (which they really are), they should do everything in their power to build up good-will for the company. Of course, they should not pay out money which does not rightly belong to the claimants. But even refusals can be worded in such a way as to make friends. Good reasons can often be substituted for dollars.

The idea of combining fair dealing, kindness, frankness and sound ethics with claim work is not new. More than one company has proved that such a policy costs less money than the old one of fighting everyone, and that at the same time it is a constructive force in the creation of good-will. Too many companies, however, are still mentally living in the stone age, when the only way to handle one's fellow-men was with a club. This will not now do with claimants or in any other kind of public relations work.

Efforts Continue Toward Drafting a Service-at-Cost Franchise

ARE the electric railways to find their salvation in the service-at-cost plan? Cleveland was the first city to try this form of franchise in a modified way. Unfortunately there was a limit to the sliding scale of fares which was intended to provide proper service and meet all costs. Dallas more recently adopted an ordinance of the same general character, having also a maximum in its schedule of fares. The new Philadelphia franchise met this situation more adequately by providing for adjustable fares without limit subject to the approval of the State commission. Then came the Boston relief measure which is now so familiar, having no limit to possible rates of fare and providing also that the State would make up any temporary deficit by a tax on the communities served by the company.

In Chicago, after working many months on a franchise to the existing companies providing for merger and for subways, the public representatives have turned to a proposed form of trustee corporation to take over the system subject to existing liens—a novel method of municipal operation with a guaranteed return to security holders assured by provisions for flexible fares. Whether or not this type of ordinance will be approved by the companies and the public is a matter which it will require some months to determine. The situation is interesting, however, as an illustration of the growing tendency toward service-at-cost legislation.

In this connection it might be profitable to turn to the experience of Cleveland as set forth in a statement recently filed with the War Labor Board. Making the point that "there is no such thing as absolute service at cost," the company's attorneys contend that the service-at-cost idea is impossible of attainment and wrong in principle.

The Cleveland management undoubtedly has given the Tayler plan of franchise a long and fair test. Starting with a 3-cent fare and a charge for transfers, the company after a year's trial gave a rebate on transfers. When the new fare schedule was found inadequate to keep up the interest fund, higher rates were put into effect until at last the maximum was reached and then the financial outlook became more than ever a cause for worry.

At the close of the last fiscal year the company reported that eight years of operation under the Tayler ordinance had resulted in a serious impairment of capital. In addition to this deficit, the company has no reserve funds for renewals, replacements or damage claims. Its 6 per cent return is, of course, guaranteed, but even this protection is said to be jeopardized unless the management resorts to the privilege of curtailing service to such an extent as to reduce its operating expenses to a safe level.

The Cleveland franchise differs from several of the more modern enactments in offering a fixed return on investment with no encouragement for initiative and economy. The older Chicago ordinances provided for a division of surplus over and above expenses. However, they contained the handicap of a fixed fare. The new Boston measure is based on a sliding scale of fares with no maximum limit, but the stock return is fixed for various periods of years. It is not unlikely that a

type of franchise will yet be worked out for some company which will properly recognize interest on investment as a necessary element of the cost of service and will make explicit provision for any higher rate of return necessary to attract new money. The guarantee of 5 or 6 per cent looked attractive some years ago, but in future even an assured 7 per cent may not be sufficient.

Company Section Delegates at the Atlantic City Convention

THE company section movement in the American Electric Railway Association is now at such a stage that it seems essential for representatives of the sections to get together to discuss ways and means for keeping up the interest during the coming strenuous war period. We use the word "coming" advisedly because thus far, with all of the splendid patriotism that has been shown, the war is just beginning seriously to affect the lives of individuals and organizations in this country. The company sections of the association have an important part to play in these times, and they should be thoroughly prepared now to play this part well. An opportunity will be afforded at the coming convention for conferences of those vitally interested in the section work to compare notes and outline programs for the coming winter, and it is none too early to lay plans now.

In every section there is one man to whom the members look for inspiration (and generally for hard work also) in the local activities. This is the man of analytical turn of mind who sees the opportunity which is before the section and who can formulate suggestions for meeting this opportunity. This man should be at the Atlantic City convention, specifically charged with the responsibility of bringing home a bagful of ideas which will make the 1918-1919 season a real success. And the only gage of success is the extent to which the section contributes to the winning of the war. Cannot each section send a representative to the convention so impressed with the importance of his job that he will really get something worth while? There will be an unwonted seriousness at the meeting this year that may well be reflected in the sections.

The companies are, very properly, going to be chary in sending delegates to the convention this year. The managers must "be shown" prospective results for every dollar of expenditure. In the case of section representatives it ought to be possible to show these results readily; if not, the section can furnish the "wherewithal" themselves. If section conferences demonstrate their effectiveness undoubtedly the association would eventually be willing to assist in financing these meetings. The American Institute of Electrical Engineers, which has only individual memberships, thinks so much of the presence of section delegates at its annual convention that it pays their traveling expenses, thus eliminating the geographical barrier to attendance. The substance of the whole matter, however, is: pick out the "live wire" in your section; charge him with the responsibility outlined above; get him to the convention, and, above all, apply his new ideas and enthusiasm when he gets home. If this line of thought appeals to any section, it should act at once.



APPROACH TO LOWER LEVEL, SHOWING TRACK UNDER CONSTRUCTION AND CONCRETED IN



VIEWS WITHIN THE BRIDGE—AT LEFT IN THE CONCRETE ARCHES; AT RIGHT IN THE STEEL ARCH



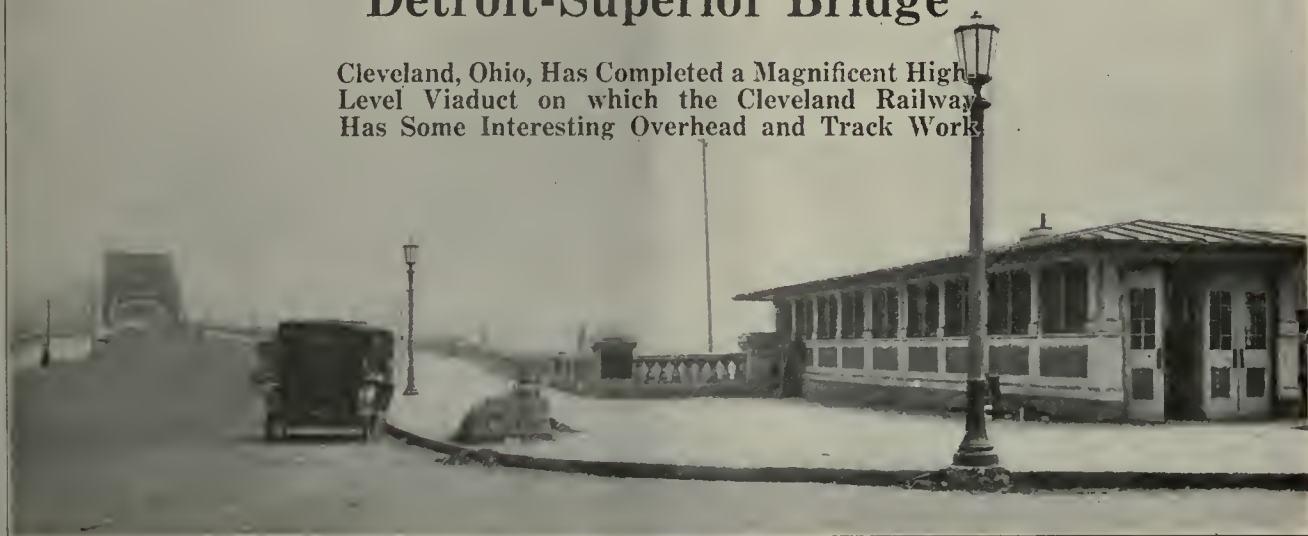
LOADING STATIONS—AT LEFT, SUPERIOR AVENUE END; AT RIGHT, DETROIT AVENUE END

Track and Overhead Construction on Cleveland's New High Level Bridge, which Connects the Eastern and Western Sections of the City

(The electric railway tracks, now four in number, are on the lower level, which is wide enough for two future subway tracks also.)

Electric Railway Construction on the Detroit-Superior Bridge

Cleveland, Ohio, Has Completed a Magnificent High-Level Viaduct on which the Cleveland Railway Has Some Interesting Overhead and Track Work

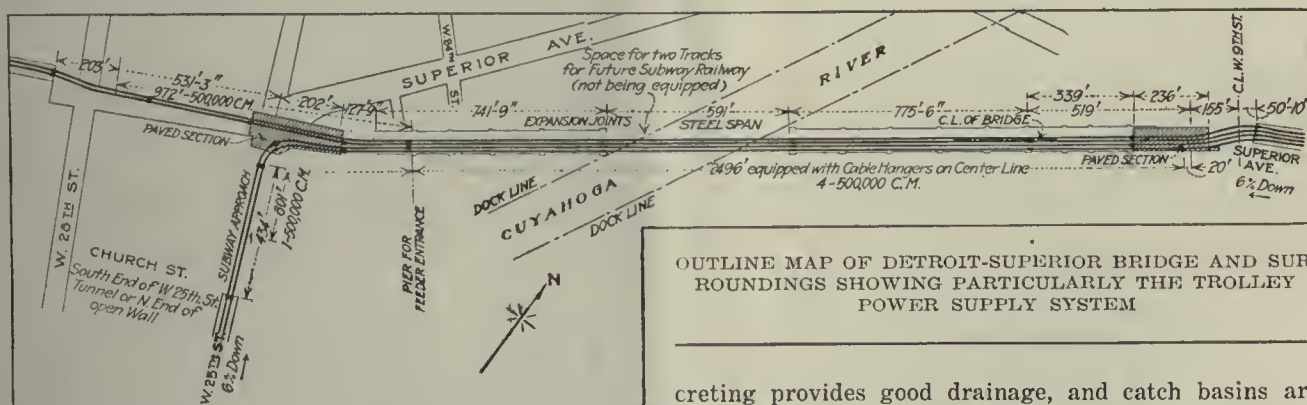


TWENTY-FIFTH STREET ENTRANCE TO ELECTRIC RAILWAY LEVEL, DETROIT-SUPERIOR BRIDGE

THE famous concrete and steel bridge across the Cuyahoga River near the business center of Cleveland, Ohio, constructed by Cuyahoga County, is now complete and the cars of the Cleveland Railway are operating under full schedule on the four tracks of the lower deck. This bridge comprises a number of graceful reinforced concrete arches on the banks of the river, and a steel arch of 591 ft. span over the river itself. The total length of the viaduct is about one-half mile. The contractor for the bridge was the Hunkin-Conkey Construction Company, to whom we are indebted for the general view reproduced on page 146.

The track is laid with 100-lb. A. R. A. Type-A rail. In the open track between the paved areas, a distance of about 2500 ft., the rails are laid on white oak ties, 6 in. x 8 in. x 8 ft. in size. The rails on the steel span are laid on 7 in. x 9 in. x 9 ft. white oak ties with regular bridge tie construction. The track is ballasted with slag, of which there is a layer 6 in. thick below the ties.

On the approaches and in the paved station areas the track is laid on International steel ties, concreted in place. Two pictures have been reproduced to show the construction, before and after concreting. The con-



OUTLINE MAP OF DETROIT-SUPERIOR BRIDGE AND SURROUNDINGS SHOWING PARTICULARLY THE TROLLEY POWER SUPPLY SYSTEM

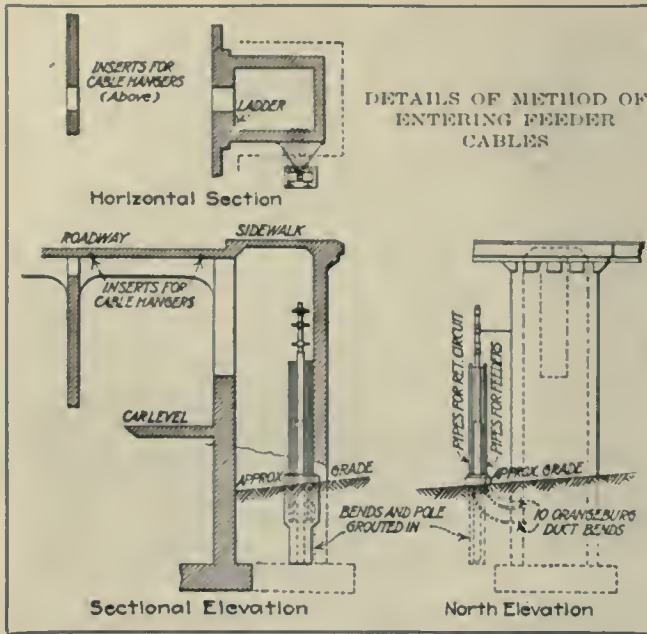
For the purpose of examining the bridge with respect to the electric railway construction it may be divided into three parts: the track approaches from the street, the paved areas at the ends of the bridge proper together with the passenger entrances from the street, and the main viaduct including the big span. The accompanying photographs have been taken to show the nature of the construction in these several sections.

Electric railway interest centers in the track, the power supply system and the provision for handling passengers. These will be taken up in turn.

creting provides good drainage, and catch basins are provided to take care of the run-off water. A layer of 1:5 gravel concrete was placed under the ties. The steel ties were used to minimize the depth of the concrete layer and on account of their general adaptability to concrete track construction.

\$125,000 SPENT ON OVERHEAD LINE MATERIAL

In designing its part of the viaduct work the overhead department of the railway was confronted with the task of supplying power to a possible bridge full of cars, a third or more of which would be on an up grade. It was necessary to be ready to furnish power up to a total



of 2500 amp. per track, which would be drawn if all of the cars should start at once.

Over each of the four tracks so far installed (there is space on the lower deck for two future subway tracks) is hung a No. 0000 grooved trolley wire, extra hard rolled. Each is paralleled for 2500 ft. in the center of the bridge with a 500,000-circ. mil feeder, tapped in at frequent intervals. A 1,000,000-circ. mil feeder cross-connects these auxiliary feeders and leads to the power plant near by. The feed wires are exposed and are strung on the cross beams of the bridge, being supported on G. E. rack-type switchboard insulators.

The trolley wire is mounted on spring-type Ohio Brass hangers spaced from 10 to 12 ft. apart. These clamp the wire loosely to permit the motion resulting from expansion and contraction. The troughs are of hardwood, securely bolted together and either clamped firmly against the concrete roof or suspended from the steel beams by means of special malleable-iron hangers. The latter can be discerned in the picture showing the construction within the steel span.

The outline map on page 145 shows the relation of the lines on the bridge to the surrounding streets and to Cuyahoga Creek. The Viaduct power house, from which the power supply is drawn, lies about 300 yd. north of the viaduct, just outside the field of the map.

One matter which the power department of the railway has been considering with particular care is a method for keeping the trolley wire taut in spite of expansion and contraction of the bridge. The plan for this has as yet not been fully worked out.

APPROACHES TO THE TRACK LEVEL

At each end of the bridge is a paved area large enough to accommodate several cars on each track, the floor being of stone blocks grouted with cement. The tracks of each line are separated by a light fencing, a diving alley providing access to the inside tracks.

Long flights of easy steps lead from the street level to the track deck with attractive housings over the stairways at the street level. A view of the entrance at Twenty-fifth Street is shown on page 145 in the head-piece of this article.

The new viaduct will greatly facilitate transportation between the eastern and western sections of Cleveland, previously hampered by limited track facilities and by the operation of a draw in the Superior Avenue viaduct. Especially fortunate is the opportunity for loading and unloading cars away from the street level, which has been taken full advantage of in the manner indicated. The railway construction has been carried out by the railway company, the track work under the direction of Charles H. Clark, engineer maintenance of way, and the overhead under that of L. P. Crecelius, superintendent of power.

Car Meters for Instruction and Skip-Stop Studies

THE San Antonio (Tex.) Public Service Company recently purchased ten "Economy" watt-hour meters which it is putting to two interesting uses. One is to employ the readings of the meters as an object lesson to recruits in teaching them the principles of car operation. This is as far as the company can go at present in the use of energy-checking devices owing to the heavy problems presented by the absence of many department heads and trainmen in military service and the extraordinary pressure on its facilities due to war travel at San Antonio.

The second use now being made of "Economy" meters is to check the power requirements in proportion to the number and duration of stops to get some conception of the fuel saving possibilities of skip-stop service.



HEAD'S-EYE VIEW OF THE DETROIT-SUPERIOR BRIDGE

The Space-Grabbing Automobile

Automobile Use of Highway Space at Washington Only One-Twentieth as Efficient as Street Cars and Far More Dangerous—Regulation of Both Automobiles and Street Cars Essential

THE relation of general traffic to street car traffic is the subject of section nine of John A. Beeler's report on the traffic situation in Washington. He points that while Washington's streets are generally wide, it does not follow that they are safe, because a wide street invites speed and permits more streams of traffic. As proof, he notes that fifty-three lives were sacrificed in Washington's streets during the past year—one life per week and the rate is steadily increasing.

JAY-DRIVERS AS WELL AS JAY-WALKERS

When the automobile was apparently insignificant it was granted or usurped privileges that cannot be retained with the tremendous proportions it has now reached. These usurpations are unlimited parking, right-of-way over other traffic, and lack of observance of due caution in crossing intersecting streets, especially those with car tracks.

While most autoists show consideration for the rights of other drivers, nearly all display a contemptuous disregard of the rights of pedestrians. One of their most annoying and dangerous practices is to approach the street crossings at full speed regardless of the traffic signal, bearing down on the cross-walk full of pedestrians, and making a sudden stop directly across the walk, blocking the passage of those endeavoring to cross the streets. Should the brakes fail, a car skid or any one of a thousand things happen, serious accident or loss of life surely results. Continuing, Mr. Beeler says: "We hear a great deal about jay-walking, but I will venture to say that for every jay-walker there is a reckless driver. Until drivers are willing or are compelled to concede the rights of pedestrians to cross the streets in safety at the proper places, we can expect jay-walking, as it is frequently safer for the pedestrians."

CONGESTED CORNERS GREATLY RELIEVED BY PREVIOUS RECOMMENDATIONS

Mr. Beeler then gave some figures to show that his previous recommendations had greatly relieved congestion. An abstract follows: On Jan. 10, 1918, a count made at Fifteenth Street and New York Avenue showed 924 vehicles passing through this intersection between 4 and 5 p.m. On March 18 a similar count disclosed a total of 1135, an increase of 23 per cent.

The average time of passage (on March 18) of each vehicle was 10.34 seconds. The total time spent by all vehicles in the intersection during the hour observed therefore was 11,736 seconds. Hence there was an average of three and one-quarter vehicles in the intersection all the time. In addition, some 203 street cars had to pass the intersection, each averaging thirteen seconds to do so. Such a condition required skill in the traffic officer directing the flow and skill on the part of the motormen to get through without striking

anything while running past the various cut-outs by momentum.

Observations showed that the 1135 vehicles mentioned carried 2144 persons, or an average of 1.89 persons, including drivers, while the 203 street cars conveyed 7541 passengers, or an average of 37.15. As each automobile averaged 10.34 seconds in the intersection and the street cars but thirteen seconds, the relative value of the car and the automobile as carriers is apparent. In other words, every passing automobile carries one person for every twenty on a street car, and for every street car held up to accommodate an automobilist, twenty people wait that one may pass. It takes less than three seconds longer in the intersection to pass a street car carrying nearly two score of persons than it does an automobile carrying less than two.

The new police regulations effective on June 1, controlling the vehicle traffic through this week have achieved marvelous results. A count made on June 20 showed the number of vehicles passing between 4 and 5 p.m. to be but 325, or a reduction from the 1135 observed on March 18 of 71 per cent. In other words, the new regulations have scattered the automobile traffic among many intersections instead of a few, much to the benefit of all.

CENTER PARKING AND ACCIDENTS

Further to increase the speed and track capacity at this point other action is necessary. For example: Automobiles are allowed to stand in the middle of Pennsylvania Avenue at right angles to and at either side of the car tracks. This results in many collisions. Automobiles are constantly going in and coming out of the parking space. Many run too close to the tracks. Others start up and run onto the tracks without first ascertaining if the way is clear. People walk between the vehicles parked in the middle of the block onto and across the tracks. Accidents are prevented only by the vigilance of the motormen.

It is interesting to note where accidents occurred along the Avenue from this cause during the period Jan. 5, 1916—May 1, 1918. A summary follows:

Location	Number of Collisions Between Street Cars and Automobiles Due to Center Parking
Pennsylvania Avenue:	
Ninth to Tenth Streets.....	20
Tenth to Eleventh Streets.....	12
Eleventh to Twelfth Streets.....	21
Twelfth to Thirteenth Streets.....	22
Thirteenth to Fourteenth Streets.....	19
Fourteenth to Fifteenth Streets.....	82
Total	176

Observations made of the traffic between Fourteenth and Fifteenth Streets on Pennsylvania Avenue show that each street car is, on an average, twenty-two seconds in the block when going west and forty-five seconds when going east. The time of eastbound cars includes stopping time at Fourteenth Street. Each

automobile that crosses the tracks between these two streets consumes twenty seconds in maneuvering on the tracks. A total of 175 street cars has to operate here in both directions in a busy hour, from which it is readily seen that with a street car every twenty seconds and an automobile maneuvering on the tracks every thirty seconds (consuming twenty seconds in such maneuvering), that both danger and delay are produced for the street cars and their patrons.

Pennsylvania Avenue has a roadway 110 ft. wide. The street cars occupy less than one-fifth of it and carry a score of people for each one transported by automobile, so it seems only reasonable to assure them a safe, clear track between street intersections without such dangerous mid-block interference as is now going on. Yet May 23 and 24 show, not including machines crossing within 30 ft. of the ends of the block or at the alley near the middle of the block, seventy-six automobiles crossed the track between 4 and 5 p.m., and 122 between 10 and 11 a.m.

Many pedestrians also cross the tracks in this block and try to find a path between the parked automobiles, greatly to their own danger. During the periods of observation, 121 instances were noted in the morning hour, and 367 in the afternoon hour. It is a strain on the motorman constantly to watch out for people dodging in and out from between these machines and onto the tracks.

As center parking is desirable if it can be done in safety, a very simple way to minimize this danger is to establish a line of stanchions set in pockets sunk in the paving. Where parking is permitted, the same wire rope can be stretched to bar the automobiles from encroaching beyond their proper limits onto the car tracks. This would also prevent pedestrians from walking between the automobiles and across the tracks. On any occasion when their presence is undesirable, stanchions and wire rope can be removed on a few minutes' notice in the same manner as they are now removed from the curbing after a parade.

SAVING TIME AT TRAFFIC OFFICERS' POSTS

At present motormen frequently hesitate after receiving the "go" signal from the traffic officer. This may be due to a lack of proper instruction. The inevitable result is that the traffic officer reverses his signal and calls for traffic to proceed from some other direction. Meanwhile the waiting car is losing time and delaying the cars behind it. Motormen must keep their eyes upon the traffic man all the time while standing and waiting for a signal, and be prepared to get a quick start immediately upon the signal to proceed, unless their cars have not finished receiving and discharging passengers.

The control and direction of street traffic is in itself an occupation that demands the service of a capable and intelligent man. As has been shown, more than 1100 vehicles and 200 street cars will pass through a busy intersection in an hour. A traffic officer is a member of the police force, but his duties are as different from those of the other members as a fireman's duties are from those of a health inspector, although both are working in the interests of public safety. Unless the man at the intersection understands traffic work, the

traffic will get through just as well or better without him. The fact that a man is good as a patrolman is about as much of a qualification for a traffic officer as it would be for an engineer in the fire department. Washington is especially fortunate in possessing some most competent men in this branch of the service.

Traffic control is so important and vital a factor upon which the comfort and safety of the public are largely dependent that the traffic squad should be under one direct and authoritative head to permit no division of responsibility. The members should be carefully selected from those having special aptitude along these lines, and they should be carefully drilled in their respective duties until they all become proficient in the art.

Precedence for street cars is a principle that merely recognizes the rights of the majority, if a passenger ratio of twenty to one may be termed by such a phrase. Perhaps it might be said to recognize the rights of the masses as against the classes, but in Washington the classes as well as the masses use the street cars. At any rate, the street cars only run on a comparatively few streets where their tracks have been laid. Automobiles can and should go elsewhere and not follow car tracks.

CHOICE OF NEAR-SIDE OR FAR-SIDE STOPS SHOULD NOT BE UNIVERSAL

No unanimity of practice or opinion on the relative merits of the near-side and far-side systems of stops exists in this country. In a number of cities where nearly every street contained tracks, street cars were making two stops, one before crossing the intersecting track for the purpose of getting the car under control and one after crossing to the far side to receive and discharge passengers. By adopting the near-side passenger stop, one stop was saved at each such street.

With the increase in automobile traffic, street accidents began to increase and a country-wide agitation was started to have street cars stop before crossing intersecting streets. The reaction set in later when communities realized that the needs of street car passengers should be paramount in matters affecting vehicular traffic. To-day, probably as many cities employ one plan as the other, and an increasing number are using a combination, depending upon the special requirements of each case.

Although some authorities take a stand in opposition to all far-side stops, the model street traffic regulations issued under the auspices of the National Safety Council and written by William Phelps Eno, whom the Council terms "probably the most expert adviser on such matters in the world," contain the following endorsement of far-side stops:

Formerly cars stopped on the far side of the street (in the city of New York) except at fire, hospital and school stops, where they stopped at both sides. In 1904 the near-side ordinance was passed at the instigation of the author, but it was soon repealed. In 1914 this ordinance was re-enacted and has since been made to include buses. (Since changed back to far-side stops for buses.)

The reasons given for the near-side stop were safety and reduction in the number of stops.

As far as safety is concerned, the author after continued study now believes the far-side stop to be the safer, both for cars and for buses.

All things considered, the author has reached the conclusion that the far-side stop has the balance of advantage and that the compulsory near-side stop should be discontinued at all streets, hospital and school streets included.

In Washington, where the near-side stop has been generally observed for a long time, Mr. Beeler's recommendations have, in order to avoid a disruption of long-established practices, followed the same plan except in those instances where some particular advantage was to be gained by using a far-side stop. Where traffic officers control and direct traffic, it makes but little difference as far as safety is concerned whether a near or far-side passenger stop is in vogue, since all traffic must receive the signal before crossing the street.

Where street cars make a near-side stop for the purpose of receiving and discharging passengers, all automobile traffic is delayed and blocks the roadway behind the car, as it cannot proceed until passengers are safely on or off. Where a far-side stop is used, however, the automobile in many instances can turn into the cross street without delay while the car is loading. The far-side stop can often be used to relieve accumulated congestion.

From the safety standpoint, the principal objection to the near-side stop is the uncertainty as to whether or not the car is going to stop to receive and discharge passengers. Under the assumption that it will stop, many drivers will spurt ahead and risk a collision in order to make the crossing ahead of the street car. Doubtless if every street car in the city were required to stop at the near side of every street, regardless of whether there were passengers to board or alight, the plan would meet the approval of those motorists whose least concern is the time it requires the car rider to reach his destination. In many foreign countries the opposite rule prevails, namely, that all vehicles are required to come to a full stop before crossing a street railway track. Which is the more sensible regulation? The street car must follow the tracks. Its course is not only self-evident but limited. It cannot go out of its way to run over pedestrians or collide with vehicles.

This brief discussion of the relative merits of each system of stops gives some explanation of the great divergence of opinion as to which is the better. With automobiles privileged to run without restriction across streets containing street car tracks, the question of whether near-side or far-side stops are better hinges on two points: (1) Is automobile traffic or street car traffic more important; (2) on the conditions surrounding each stopping place, such as volume of the various kinds of traffic, liability of congestion, previous practice in the community and convenience of the car patrons. Street car stops should not be located according to an inflexible rule requiring all stops to be near-side or far-side, but according to selections based entirely on the factors listed above, and clearly indicated by car-stop signs.

NO PARKING AT CAR STOPS OR PLOW PITS— EXCAVATION AND BUILDING PERMITS

No parking of vehicles should be permitted opposite any plow pit or between any plow pit and the curb line. In addition to the prohibition of any vehicles standing between any raised loading platform or safety zone and the curb, no vehicle should be permitted to stand within 15 ft. of any regular car-stop sign.

Before making excavations or openings of any character in the roadways within the congested district, the permits should have the approval of the Police

Department (or the traffic division thereof). This will enable those in charge of the control of traffic to ascertain in advance when and where any important changes in the flow of traffic will occur and to provide against congestion or tie-ups by taking such measures as are necessary and desirable to prevent confusion and delay.

The regulation governing the use of building permits should be modified within the newly defined "congested district" to allow the builder to use during construction only the sidewalks of any street with car tracks on it, except that an allowance may be made for the erection of temporary sidewalks to allow pedestrians to pass the work in safety.

IN WASHINGTON RIGHT-OF-WAY FOR VEHICLES SHOULD BE FROM THE RIGHT

At present where the flow of traffic is not controlled by a traffic officer, vehicles moving north and south have the right-of-way over those going east and west. The "north and south" plan originated in New York. It is especially adapted to the necessities in that city, as practically all the main heavily traveled arteries there extend north and south.

Mr. Beeler believes that the plan of giving the right-of-way to the vehicle approaching from the right would be better adapted to conditions in Washington where the important thoroughfares extend in all directions. The right-hand rule is working admirably in many important cities. Its application at Washington would undoubtedly simplify vehicular traffic and prevent mix-ups, accidents and confusion, not only on the streets intersecting at right angles, but at the busy circles and on the diagonal thoroughfares, such as Pennsylvania, New York, Massachusetts and New Hampshire Avenues.

Novel Car Poster in New York

The paper of the
Subway with a
newspaper in it
and a car stop
sign

The Subway Sun

Published weekly by the Interborough Rapid Transit Company

THE WEATHER
forecast for the
week ending
August 1st

VOLUME 1

JULY 22, 1918

NUMBER 1

WONDERS OF THE SUBWAY

The New York Subway is the greatest and safest passenger transportation enterprise in the world.

It is so safe that the passenger has 1,900,000,000 chances of arriving safely to 1 of a fatal accident.

Including the new Lexington and Seventh Avenue lines, the Subway is now running trains on 157.22 miles of track, a distance greater than from New York to Albany, and is using for this purpose 1,293 cars.

4,064 trains are operated every 24 hours and 1,200,000 people are carried every day.

[Time figures do not include the Manhattan "L" line.]

All the railroads in the United States West of the Mississippi and south of Washington do not carry as

Our posters wouldn't hold all we wanted to say so we've decided to print a paper



many people per day as the New York Subway.

Since the Subway opened on October 27, 1904, nearly fourteen years ago, we have carried a total of 3,882,500,000 passengers and only two were killed in train accidents.

We have carried the entire population of the globe for each person killed in a train accident.

EDITORIAL

Serious problems confront all public utilities.

Upon the proper settlement of these problems depends the quality of the service given to the public.

Upon that service being maintained at its highest pitch of excellence depends the efficacy of a most important agency in helping to win this war.

These problems cannot be solved without the support of the public. And the public is entitled to full information upon which to base its judgment.

We are seeking to advise the public as to the conditions we must face in rendering our service.

Morton S. Alperin
President

THE "SUBWAY SUN," THE LATEST INTERBOROUGH CAR POSTER

The latest subway poster is the *Subway Sun* which is reproduced herewith and was carried in cars on July 22. Its likeness to a newspaper gave the occasion of a number of jokes in the New York daily papers. The New York *Sun*, for instance, described the central engraving as "a full length portrait of Managing Editor Ivy Lee, turning the crank of the first unsuccessful newspaper press."

Home Attractions Keep Track Laborers Satisfied

Solving the Labor Problem by Providing Free Section Houses With All Conveniences, Land for Gardens and Chicken Raising as Well as Free Transportation to Amusement Places for Their Employees and Families

By CLIFFORD A. ELLIOTT

Cost Engineer Maintenance of Way Department, Pacific Electric Railway, Los Angeles, Cal.

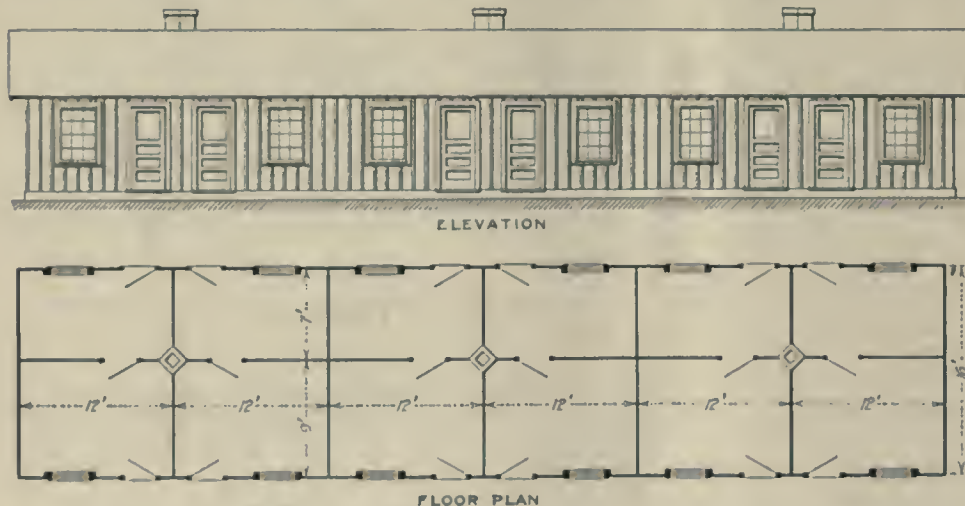
THE present labor shortage has become a serious problem on electric interurban lines. The Pacific Electric Railway prides itself on its past and present efforts to meet the acute situation and retain laborers for maintaining its track. In southern California Mexicans have always been used for trackwork due to the reasonable wages for which they can be obtained. However, during the present war the supply has been badly depleted because the United States government established the literacy test, this barring from the country a large number of Mexicans who are anxious to enter the United States to engage in this work. Many

All of these conditions tend to work a hardship on the railroads in holding men in service and in maintaining a desirable organization.

HUMAN NATURE STUDIED TO HOLD LABORERS IN SERVICE

The Pacific Electric has experienced these inroads into its maintenance organization so frequently that steps have been taken to hold it together by thoroughly studying the psychological and human nature side of the question. At the same time, modern and consistent wages are being paid to track laborers.

The Mexican is of a migratory nature, so that men



STANDARD SECTION HOUSE PACIFIC ELECTRIC RAILWAY

Mexican laborers have also migrated from southern California into Washington, Oregon, Montana and other Western states. Here attractive wages are paid them by mining companies and numerous other industries. They take the places of Italians, Slavs and Greeks, who have returned to their own countries on account of the war.

The Mexican has even invaded Eastern states to take the places of other foreigners in track maintenance and freight handling on steam roads, and large numbers were taken to Alaska to work in the fish canneries. Furthermore, the vast acreage planted to sugar beets in southern California has demanded large quotas of Mexican laborers during the summer. The wages for beet harvesting are attractive, and the restless Mexican is inclined to enter this work for the temporary period required for handling the crops and to work hard for several months. Then he is content to remain unemployed for two or three months thereafter, until, in Indian fashion, he has squandered all of his earnings.

with families have always been given preference over single men in employment. In addition, attractions have been provided constantly to hold them in service. The married Mexican is a lover of his home and its environment. Therefore, the Pacific Electric, a number of years ago, provided adequate and commodious section houses for living quarters free of charge in convenient section camp divisions, advantageously located for handling the maintenance work. These camps, where possible, are located near sidings or stations which may be easily reached by special cars to collect and distribute the track gangs. An accompanying plan shows the usual type of building erected for housing the men.

The standard type of section house is usually constructed with six units, lighted by electricity to avoid fire hazard. Additional units may be added as required. Stoves are installed in each section camp for cooking and heating, and adequate fire protection is provided to reduce insurance rates. Accompanying illustrations

show the latest model camps provided at Culver City, the home of the large Triangle Film Corporation's plant, and at El Monte Station.

In the general view of the Culver City camp a steam heating and hot-water plant is seen on the extreme right. Immediately to the left of this is the room for the family washings, provided with hot and cold water, tables and benches. On the extreme left in the view are toilets separately maintained for men and women. Garbage cans can be seen conveniently located at the kitchen doors. The heating plant and hot-water system furnish hot water during the daytime for the women at the camp, thereby saving their energy and reducing the fire hazard.

FLOWER GARDENS AND CHICKEN YARDS ARE PROVIDED

A further study of the Mexican's mode of living demonstrated that his home was incomplete without flowers and a few chickens and rabbits. The company therefore erected pergolas and chicken yards at each section house layout and planted flower gardens. The company's chief gardener and his staff give a portion of their time to maintaining the flower gardens at these camps.

When the food conservation wave swept over the United States last summer the Mexicans took exceptional interest in the company's plan to have them cultivate and plant gardens around the section camps and along the right-of-way. The company furnished free garden seed and the chief gardener and his men superintended the planting and gave the necessary instructions. Several prize gardens were developed by the Mexicans, and one raised enough to supply his own family and sold a few dollars' worth of vegetables besides.

A GARDEN CONTEST PRODUCED GREAT RESULTS

A garden contest was conducted by the company at the section camps as follows: Plots of ground of uniform size were set aside in front of the laborer's houses. These were planted to small vegetables, and a close watch was kept to determine which man produced the greatest results. At the side or rear of the main layout



PERGOLA AND PLAYGROUND EQUIPMENT AT EL MONTE STATION CAMP

of section houses a large plot of ground was also assigned to the laborers who were housed at the camp, to be used for raising potatoes.

As this welfare work progressed, the company, on its own initiative, undertook to teach sanitation to the Mexican track laborers and their families, as it realized that sanitary camps meant an increase in intelligence

and efficiency. More modern toilet facilities, less crowded quarters, fresh air privileges and shower baths were provided. Washrooms with concrete floors, drains, storm sewer and cesspool connections were installed.

The houses were screened and a general sanitation program was carried out, which in time pleased the Mexicans and won the hearty approval of the State, County and city health authorities. The arrangements were strictly in accordance with the legal requirements of the California State Commission of Immigration and Housing. This latter body has given the services of its inspectors and sanitary experts to advise and assist the company in improving the status of the workmen. The company also supplied free fire wood to its laborers at the camp, utilizing discarded ties for this purpose. A contract has been made with an outside company to conduct a commissary department at each camp, and supplies are provided at reasonable rates approved each month by the railway company. The company protects the commissary department on its payrolls.

PROMPT ACTION PREVENTS A SPREAD OF TYPHUS

Recently the company experienced in one of the camps a "scare" regarding typhus, a type of fever in which the fatalities are high among Mexicans.

The disease was carried into the camp by a new employee. The promptness and success with which measures were taken to prevent its spread in spite of temporary opposition were highly creditable to the company's medical department. Since then the maintenance of way department has employed a competent nurse, who thoroughly understands the conditions. Her time is entirely devoted to the canvassing among the camps and teaching the Mexican women and their children the rudiments of hygiene.



SECTION HOUSES AT EL MONTE STATION, PACIFIC ELECTRIC RAILWAY



GENERAL VIEW OF SECTION HOUSES AT CULVER CITY CAMP—PACIFIC ELECTRIC RAILWAY

Further to promote camp sanitation the company has a force which visits and thoroughly cleans up the camps and grounds daily. Incinerators have been constructed to dispose of the waste materials and garbage, and metal garbage cans are maintained.

Since the United States entered the European war the labor situation has been decidedly acute. The higher wages offered by other corporations for the Mexican laborers has a tendency to draw the men away from the company. Therefore extraordinary efforts still further to attract the Mexicans for the railroad service were exerted. As the Mexican is a good worker when he knows his family is contented, the company constructed at its camps various playground and amusement features, such as swings, teeter-boards, handball courts, etc., that were attractive both to children and to the adults. Minor conveniences were provided about the houses, also, to favor the women. About 99 per cent of the Mexicans in the camps are ignorant, being unable to read and write. To meet the educational need the company established schools at its most important centralization camps, and the women are being taught English, reading, writing, domestic science, thrift, economy and marketing, etc. Suitable educational work is also being done for the children. The girls are taught sewing, cooking, while the boys have manual training, many of them taking up the carpenter trade course, with the expectation of entering the bridge and building department or the shops of the railway company.

FREE EXCURSIONS TO BEACHES PROVIDED BY THE RAILROAD

During the hot summer months the company arranged free excursions to the beaches for the women and children. In addition, at the end of each month the laborers and their families are furnished free transportation to points on the system which they may desire to visit. Usually these trips are taken on Sunday. The company provides continuous police protection in each camp to maintain good order and to keep out agitators, especially I. W. W. plotters who have a large following among the worthless class of Mexicans. These are always anxious to get into peaceful camps to stir up discord and discontent and to work against the selective draft of the government.

During the draft call the company vigorously trained its Mexican employees, through patriotic propaganda, not to avoid the draft, even if they were not citizens of this country. Excellent results were obtained. When the company purchased some \$500,000 worth of Liberty Bonds and sold by the partial payment plan about \$265,000 worth of these to its employees, the poor and ignorant Mexican laborers proudly did their bit by subscribing.

As an extra attraction the company is using a merit system, under which, if the women and children in each camp meet a certain standard of cleanliness each week they are rewarded with free passes to Los Angeles for shopping and pleasure trips. If they do not qualify for Class A-1, then this privilege is granted to them only every month. If they are careless about observing the rules they are disqualified from receiving any such free transportation. The families look forward joyously to these trips to the city and the contest has gained considerable favor.

How Economies Are Effected

Kansas City Railways at Rate Hearing by Public Service Commission Points Out the Methods It Has Used to Save Money

AT A RECENT hearing before the Missouri Public Service Commission on the application of the Kansas City Railways for permission to charge a higher fare, the company presented among its exhibits a list of methods used to effect economies in construction, maintenance and operation. This covered the various means taken to reduce operating expenses, in the effort to make them come within the revenue and provide for interest and the allowed dividends. The list follows:

WAY AND STRUCTURES

Cast-Iron Bound Special Work. This is used instead of solid manganese in special work repairs.

Arc Welding Process. This is for repairing special work and welding all defective joints in repairs, thus saving the installation of new steel.

Welded Joints. Seventy-eight per cent of all paved track now has welded joints, effecting a large saving in return current, electrolysis troubles and copper bonds.

Track Machinery. In all track work labor-saving devices are used, such as pneumatic tie tampers, pneumatic drills and riveters, electric drills, electric spike drivers for screw spikes, and pneumatic and electric rail benders.

Asphalt Plant. This is capable of handling all asphalt needed for company work and can be operated by five men in place of twenty-five by the old process. It is capable of instant conversion to a sand drying plant, in which all sand for the cars is dried.

A Portable Rock Crusher. This crushes old concrete and worn granite blocks to be again used as ballast.

Rail Grinders. These effect a saving in track repairs.

Pneumatic and Electric Tools. A complete line of the most modern pneumatic and electric tools for all purposes, together with a central storehouse and repair station where such tools are stored and kept in repair.

ELECTRICAL DISTRIBUTION DEPARTMENT

Distribution System and Automatic Substations. The electrical distribution system has been entirely rearranged and automatic substations have been installed. This has made possible a saving in copper wire alone estimated to be more than \$100,000, and secures more reliable and constant service, effects great reduction in current losses and allows a reduction of the substation operating force.

Motor Trucks. The use of motor-driven repair and emergency trucks secures greater efficiency and reduces the emergency force.

Nitrogen Lamps. The replacing of cluster and arc lights with 200 volt nitrogen lamps reduces current and maintenance cost.

Automatic Signals. The installation of automatic signal systems at all dangerous crossings reduces accident hazard.

POWER HOUSE

Underfeed Stokers. The installation of underfeed stokers, by increasing the efficiency of combustion, secures an increased generating capacity and allows the burning of high ash coal.

Rehabilitation. A program of complete rehabilitation includes the use of every modern economy device at the power plant.

CAR EQUIPMENT

Light Weight Cars. The adoption of a standard double-truck car of light weight, reducing the weight per passenger carried, has effected a saving of from 24 to 37 per cent in power over the types preceding.

Folding Doors and Steps. The equipping of all cars with folding doors and steps has greatly reduced accidents.

Door Engines. Door engines to operate folding doors and steps are a time and labor saver.

Thermostat Heat Regulators. Thermostat heat regulators, in addition to maintaining an even temperature in the cars and conducing to the comfort of passengers, also effect a great saving in power consumption.

Fare Boxes. These effect a material saving in time and secure better fare collection.

Coasting Recorders. Coasting recorders and a special power saving department have been installed. The recorders have effected a saving of 10 per cent in the power formerly used and in addition are a material factor in reducing certain classes of accidents and in keeping down electrical equipment maintenance.

Slack Adjusters. A thorough trial of slack adjusters demonstrated that these will automatically keep the brakes tight, eliminating the constant adjusting of brakes at the barns.

Bearing Springs. The use of coiled springs in motor bearings permits the use of worn bearings, thus effecting a large saving in maintenance.

OPERATION

One Man Cars. These are used where possible on outlying lines.

Front End Collectors. These are employed at heavy transfer points, facilitating prompt loading.

Stop and Loading Signs and Safety Zones at All Corners. These speed up operation.

Traveling Train Instructors. Their duties are to instruct the men on the road and secure more efficient operation.

Emergency Transfers. These eliminate much transfer waste and save time.

Electric Switches. The increasing use of electric switches makes for speedier operation.

Dispatching System. A complete dispatching system, with dispatchers at all points of heavy traffic, prevents unevenness in schedules with resulting inconvenience to the public and thereby effects a saving in platform time.

Skip Stop. Kansas City was the first place in the United States to adopt the odd and even stops during rush hours. This skip-stop system will shortly be applied to the entire system and will effect a saving in power and speed up schedules.

Modern Traffic Department. Constant checking allows more flexible adjustment of the service to traffic conditions, has effected a very material decrease in car hours, has cut out dead mileage and, while making possible better service, has effected a great saving in platform expense. The following is a sample of what is being done constantly:

	April, 1917	April, 1918	Change
Maximum cars scheduled daily.....	629	649	+20
Car hours scheduled daily	8,072	7,522	-550
Car miles scheduled daily	74,468	67,403	-7,065

Car Barn Changes. The elimination of outlying car barns has effected a large saving in dead mileage. By this means equipment is concentrated, and by reducing fire hazard, insurance rates have been lowered.

SHOPS AND MAINTENANCE

Labor Saving Machinery. Every known labor-saving device, including the latest type of welding machinery, has been installed at the car shops.

Salvage. Salvage of material of all kinds is made possible by the use of the oxyacetylene welding process.

Painting. Enamel is used in painting cars, thus securing longer life and cutting down the initial expense.

Wheel Grinders. Wheel-grinding machines at the car houses allow the grinding of wheels without removal from cars.

Remodeling. The remodeling of equipment and the rebuilding of cars greatly add to the normal life of rolling stock.

MISCELLANEOUS

Safety Campaign. A continuous safety campaign has greatly reduced certain classes of accidents.

New Ideas. In the last four years representatives of the company have visited every large system in the United States and have put the best ideas of each into practice.

Advance Purchases. A large saving was effected by the purchase of large quantities of materials before the sharp advance.

Organization. The organization has been completely rearranged from the top down to secure greater efficiency in operation and economies in every department.

Fare Increase Successful in Bradford, England

The increase of 50 per cent in the tram fares of Bradford, England, has so far been successful. The manager of the tramways department states that the receipts for the first nine days under the increased charges had been £13,099, as compared with £9,906 for the corresponding period of last year. This represented an increase of 32 per cent, whereas the official estimate was 30 per cent when the increase was decided upon. It is understood that the number of passengers had been considerably reduced, and the shorter queues have been very noticeable. The tramway committee of the city has decided to make a reduction in the number of stopping places on the various routes of the system.

Japan Trying Women Conductors

As an experiment a few women were put on the cars of the Mino Electric Company, Gifu Prefecture, Japan, a few weeks ago and if they prove satisfactory other women will be similarly employed. There is a shortage of labor in Japan due to the general activity in manufacturing, but the proverbial reserve of Japanese women renders their introduction into car platform service rather more difficult than in western countries.

High-Speed Circuit Breaker Prevents Flashovers on Milwaukee Electrification

With This Apparatus the Energy Waste Resulting from the Installation of a Permanent Resistance or an Increased Length of Feeder Cable to Reduce High Current Values Is Avoided

WHEN the decision to use high-tension direct current was made by the Chicago, Milwaukee & St. Paul Railway it was recognized that some means would have to be taken to prevent the flashover of the direct-current generators in case of a short-circuit on the overhead line. One suggestion made was that the company install resistance in the substations in series with the trolley circuit to cut down the current to a safe value. However, it was found that the construction of a suitable permanent resistance would be difficult and expensive; that the resistance would take up a great deal of room; and finally, that the energy waste would be appreciable. The electrification department, through R. Beeuwkes, electrical engineer, therefore favored the trial of some simpler and more

Rocky Mountain division—where telephone and telegraph circuits are located. There are no transpositions on the high-tension line.

FUNCTIONS AND OPERATION OF THE HIGH-SPEED CIRCUIT BREAKER

The function of the high-speed circuit breaker hereafter described is to operate with sufficient speed to check the rise in current caused by a short-circuit before damage can be done to the converting equipment. In order to meet this requirement, it is necessary that the rise in current be checked within a few thousandths of a second, and the circuit breaker described below meets these conditions in every respect. The rate of acceleration on the main and secondary contacts is approximately 8000 ft. per second and they are released in a time

as short as 0.003 second or less from the beginning of a short-circuit. The time from the beginning of the rise in current caused by a short-circuit until the secondary contacts part has been shown by test to be of the order of 0.004 second. This compares with about 0.10 to 0.15 second, the speed of ordinary switchboard type breakers. The designers have thus succeeded in building a breaker which will in effect foresee the rise in current caused by a short-circuit and insert sufficient resistance to limit this rise to a safe value.

It has been the practice on many railroads to install a certain amount of feeder as resistance between the substation and the tapping-in point usually by carrying out the feeders to some distance from the station before tapping in. It was evident, therefore, that if apparatus could be developed to protect the generators from flashover on severe short-circuits, it would permit of the feeders being tapped directly to the trolley at the substation, thus eliminating the losses due to feeder resistance.



FIG. 1—HIGH-SPEED CIRCUIT BREAKER WITH ARC CHUTE REMOVED. FIG. 2—HIGH-SPEED CIRCUIT BREAKER WITH MAGNETIC BLOWOUT
3000 AMP., 3600 VOLTS

economical method. To this end, the General Electric Company developed a high-speed breaker which was tested out at Schenectady on a motor-generator set made for the Milwaukee electrification.

An auxiliary benefit of no mean value is the greater protection afforded to the company's telephone circuits which parallel the contact line. Since the installation of these breakers, the annoying acoustic shocks which previously occurred from short-circuits have disappeared. Notwithstanding the fact that this telephone line parallels both the 3000-volt direct-current contact line 40 ft. away and the 100,000-volt alternating-current transmission line 80 ft. away, the operation of the telephones is very satisfactory.

No attempt was made to eliminate inductive interference other than fully to transpose the weak-current circuits for varying lengths; to see that the insulation was in good condition; and finally, to install fuses in the circuits at the stations—both the Missoula and



FIG. 3—HIGH-SPEED CIRCUIT BREAKER INSTALLED IN JANNEY SUBSTATION, CHICAGO, MILWAUKEE & ST. PAUL RAILWAY

Preliminary calculations in connection with the electrification of the Chicago, Milwaukee & St. Paul Railway showed that quite an appreciable amount of power could be saved each year by the elimination of this extra feeder resistance. Work was therefore initiated on the development of an air circuit breaker which would have such a high speed in opening that it could be used to insert resistance in the circuit soon enough to prevent the

very satisfactory results. All substation feeders are tapped to the overhead trolley system directly at the substation, eliminating the resistance losses occasioned by tapping at some distance away. Actual operation has demonstrated that it is entirely practicable to operate direct-current stations in this manner when protected by the high-speed circuit breaker, even though the voltage of the system (3000 volts) is the highest direct-current voltage used in commercial railway work.

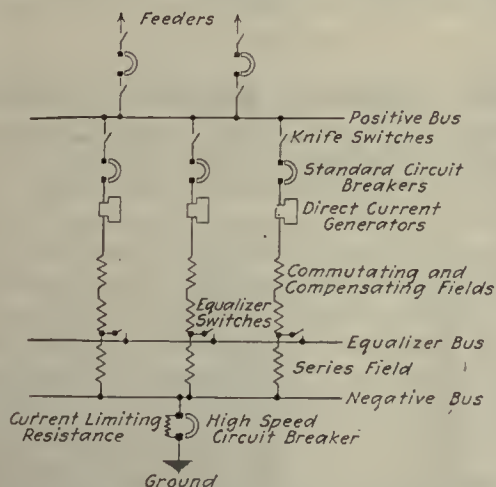


FIG. 4—D.C. CONNECTIONS FOR SUBSTATIONS WITH THREE MOTOR-GENERATOR SETS PROTECTED BY HIGH-SPEED CIRCUIT BREAKER

short-circuit current from reaching such a value as to cause the direct-current machinery to flash over. This design of breaker required a speed much faster than anything ever before attempted. Careful investigations demonstrated that the device must operate in a shorter time than is required for one commutator bar to pass from one brush to the next or less than one-half cycle for that particular machine.

One of these breakers is installed in each substation and connected into the negative return circuit between the ground and the negative bus, as shown in Fig. 4. This location affords the maximum protection, since the return circuit must pass through the limiting resistance in case of a flashover from the positive to ground, as all of the negative terminals, bus rigging, etc., are insulated for full generator voltage. To insure complete protection the high-speed breaker is so interlocked with the regular switchboard type of air

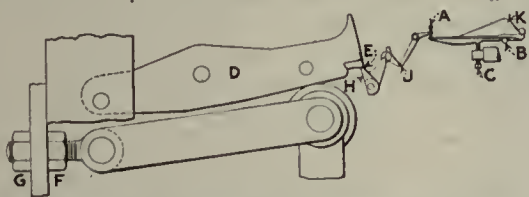


FIG. 5—DIAGRAM OF LEVERS FOR TRIPPING AND RE-SETTING THE TYPE MW CIRCUIT BREAKER

circuit breaker that the high-speed breaker must always be closed before the switchboard breakers.

The fourteen 3000-volt direct-current substations on the Chicago, Milwaukee & St. Paul Railway are equipped with this new type of breaker, and the first units installed have been in operation since early in 1917 with

CIRCUIT BREAKER IS MOUNTED ON AN INSULATED FRAMEWORK

The high-speed circuit breaker installed for the Chicago, Milwaukee & St. Paul Railway is of the single pole, magnetic blowout type rated 3600 volts, 3000 amp., direct current. The breaker and mechanism for a self-contained unit are mounted on a structural iron framework with cast-iron base. The base and framework are in turn mounted on an insulated base to insulate the circuit breaker from the station floor. The operating mechanism is so arranged that the breaker can be closed either by hand at the breaker or by a motor controlled from the station switchboard. The closing of the breaker by means of the motor is accomplished by a

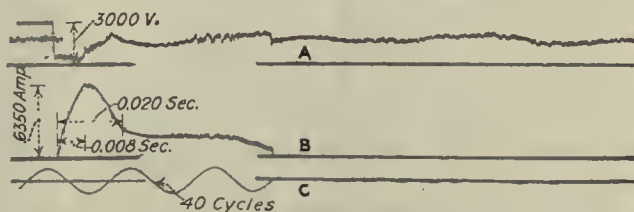


FIG. 6—OSCILLOGRAPH RECORD OF SHORT-CIRCUIT ON MOTOR-GENERATOR SET CHECKED BY HIGH-SPEED CIRCUIT BREAKER

Curve A—Voltage across generator terminals 1 mm.=143 volts.
Curve B—Current positive terminal of generator 1 mm.=174 amp.
Curve C—Timing wave 40 cycles.

cam mechanism operated through gears. When closed by hand, a ratchet mechanism is used.

The main contacts are of the well-known laminated brush type, the brushes forming the stationary contacts. The movable contact is a solid copper forging which is made as light as possible in order to reduce to a minimum the mass to be moved in operation. Secondary contacts are located above the main contacts and are of very ingenious design to insure their breaking after the main contacts in order to prevent any possibility of burning the current-carrying parts of the main contact. All of the contacts are located in a blowout chute of insulating material designed to withstand the burning incident to the arc. The blowout magnet is of laminated iron of large section. The blowout coils and trip coils are connected in series so that the blowout coils are excited at all times, as the usual arrangement of shunt blowout coils was found to give insufficient speed of blowout. The main and secondary contacts are carried on a lever and this lever is actuated by a nest of compression springs which exert a force of about 8000 lb. when the breaker is adjusted for operation. It was found that this pressure was required to give the rapid acceleration necessitated by the high-speed conditions under which this circuit breaker is required to operate.

The tripping is accomplished through a train of

latches and levers actuated by a solenoid, the magnet frame and core of which is specially laminated to obtain a quick magnetic response to the short-circuit current. The object in using a series of several latches is to allow the mechanism to move the main latch through a distance of $\frac{1}{4}$ in. or more by means of a solenoid. This solenoid, in order to act in the time required, is able to move only a distance of about 0.001 of an inch and can exert a force of only about 200 lb., while the main latch is subject to a pressure of about 4000 lb. transmitted through a lever from the compression spring above referred to.

In order to take care of the varying number of units in the several stations, the calibration is obtained by means of an adjustable tension spring directly opposing the pull of the solenoid. Referring to Fig. 5, the actual tripping takes place at *J*. The levers *A* and *K* are for multiplying the movement of the solenoid, which delivers its force at *B* so as to obtain a movement large enough to be entirely definite. The latches from *E* to *J* are special forms of levers which reduce the great pressure at *E* to a value which can be handled by a small bearing surface at *J*.

Upon the opening of the breaker contacts, the resistance becomes increasingly effective due to the resistance of the arc as the breaker completes its operation and after the lapse of about eight-thousandths of a second or less from the beginning of the short-circuit (see oscillograph record, Fig. 6), the resistance has increased to such a value that no further rise of current can take place.

This method of protection has given such satisfactory results that high-speed circuit breakers have been adopted by the General Electric Company as standard on all 3000-volt direct-current generating apparatus for steam road electrification. Actual service has demonstrated that the high-speed breaker will protect the generating apparatus from all short-circuits experienced, and not only will prevent damage to the brush rigging, commutator, etc., but will relieve the duty on the regular switchboard air circuit breakers.

The oscillograph record shown in Fig. 6 gives a good idea of the remarkably high operating speed of this circuit breaker and the resulting protection against damage to equipment. It may also be noted that this oscillogram shows the maximum current rise of less than ten times normal which is quickly reduced to well within the commutating capacity of the machine. With this method of protection, none of the effects of the direct-current short-circuits is transmitted through the set to the alternating-current side, thereby preventing such disturbances from affecting in any way the alternating-current supply system.

Modern Cars Speed Up Car Loading

THE value of a well-designed car from the standpoint of ability to load quickly and, therefore, to maintain a high schedule speed, or conversely, to operate a greater number of car-miles for a given platform expense, is well shown by some tests made recently by C. D. Smith, superintendent of transportation Mahoning & Shenango Railway & Light Company, Youngstown, Ohio. The loading times expressed in seconds per passenger were found to be as follows: Peter Witt car,

0.9 second; standard-type car with doors at both ends, 1.35 second, and high-floor center-entrance car, 1.5 second.

These cars are roughly of the same seating capacity. The Peter Witt cars were of the lot of thirteen delivered to the company last September. The data were taken at the Public Square in Youngstown, from which point all cars start their runs. During the rush-hour period the passenger interchange at this point is very heavy.

Safety Education Reduces Accidents

The Worcester Meeting of the American Society of Mechanical Engineers Was Devoted to a Discussion of the Safety Movement

IN VIEW of the draft made on the gross earnings of electric railways by accident claims, some of the discussions presented at the Safety Education Session of the American Society of Mechanical Engineers at its recent Worcester meeting should be of interest to electric railway men. In a paper by L. A. DeBlois, safety engineer E. I. du Pont de Nemours & Company, Wilmington, Del., it was brought out that safety engineering is more than merely a matter of safeguarding and advertising. An analysis of industrial accidents shows that from 15 per cent to 25 per cent are of the so-called "unavoidable" class.

Of the remainder, or avoidable accidents, between 10 per cent and 20 per cent are caused by unsafe mechanical or structural conditions and are therefore possible of correction. From 80 per cent to 90 per cent are attributable to human defects, that is, to ignorance, carelessness, irresponsibility, indifference, disobedience, recklessness, horse play and inexperience, and to defects of system, such as lack of proper supervision, discipline, etc., in the organization. The remarkable thing about the above figures are that they seem to apply equally well to all industries, being practically the same for such industries as explosives manufacturing, cement making, mining, railroading, and others in which it is usually considered that the life hazards are widely different.

So far as the structures with which the railway industry is concerned it was pointed out that stairs, handrails and narrow aisles are common causes of accidents. In the shop, insufficient headroom making machines, valves, etc., difficult to get at for repairs and manipulation are also fruitful accident producers. In connection with machinery it was pointed out that no machine can be made absolutely foolproof even in its regular operation and that conditions occur during adjustment, oiling, cleaning, repairs, etc., under which even the best safeguards may be either absolutely useless or introduce hazards of their own.

As the human element offers the greatest opportunity in the way of accident reduction the stress evidently should be placed upon the education and training of the individual workers in the matter of safe practices and the conditions which constitute hazardous operation. The organization of a safety department with a capable safety engineer or inspector was advocated. The men in charge of this safety work should be more than mere workmen transferred to a new job and should have the full backing of the higher executive officers.

Labor Main Topic at C.E.R.A. Summer Meeting

Automatic Substations, Duties of the Claim Agent and Fundamentals of Railway Advertising Were Also Considered at Outing and Conference Held at Cedar Point, Ohio, on July 17 and 18—Program Was Largely Impromptu, Due to War-Time Conditions

SUPPLEMENTING the telegraphic report of the summer meeting of the Central Electric Railway Association given in last week's issue of this paper there are printed this week abstracts of the only formal paper read, that by H. A. Nicholl, and of the informal papers and discussion. The meeting was held at "The Breakers," Cedar Point, and was attended by approximately 225 members and guests. F. W. Coen, vice-president and general manager Lake Shore Electric Railway, president of the association, presided.

The entertainment was of the simplest character, appropriate to the times, the natural and artificial attractions of the place furnishing ample opportunities for recreation. A beach-ball game was played on Thursday, between a "supplymen's" team, and a "railwaymen's" team under the general direction of S. D. Hutchins and H. A. Nicholl respectively. The supplymen won.

The discussion of Mr. Nicholl's paper, which is abstracted in another column, showed that the members realize the gravity of the situation confronting the electric railways. The abnormal upward tendency of labor costs, and with this the impracticability of competing with war manufacturing industries for labor on a per-hour basis, formed the topics of most earnest discussion. The railway managers expressed themselves as in sympathy with the desire of the men for wages commensurate with rising living costs, but did not see how they could meet by proportionate increases the competition which has been forced upon them. The railways must increase their efforts along lines of making the work as attractive as possible to the men as well as by granting reasonable increases. The discussion brought out some of the results of efforts to do this. The working of the inexorable "law of supply and demand" was seen to be particularly hard on electric railways at this time.

THE AUTOMATIC SUBSTATION AS A PARTIAL SOLUTION OF THE LABOR PROBLEM

The Thursday program was "shot to pieces" by the prevailing conditions, so that an impromptu one was substituted. With practically no preparation three speakers briefly but effectively presented "snap shots" of vital matters in their respective line of work. The first speaker was C. Dorticos, of the General Electric Company, who took up the automatic substation. Before doing this, however, he gave a graphic account, with sketches, of the battles of the Marne and Verdun.

Mr. Dorticos started by saying that the automatic substation has proved its reliability, and that it is here to stay. It began, in this field, with a request made by Bion J. Arnold addressed to the General Electric engineers at Chicago that they furnish him with an equipment for railway work somewhat along the same lines as the Edison Illuminating Company, of Detroit, had been using in remotely controlling a substation. At

Detroit control wires were used between the substation and the power plant, but by utilizing the variation in direct-current voltage the General Electric engineers were able to dispense with any control connection with the power plant. A sample outfit was constructed at the Chicago repair shop, using largely direct-current control. The Schenectady staff was called into consultation when Mr. Arnold wanted more control outfits. The control was then transferred to the alternating-current side of the station with the exception, of course, that the direct-current voltage remained the source of ultimate control through the operation of the contact-making voltmeter. This work was done in 1914.

Soon after this pioneer work it happened that the Des Moines City Railway had agreed with the municipal authorities that, with the going into operation of a new franchise, certain rehabilitation of the property would be put through. An important part of this consisted in extensive power supply improvements. F. C. Chambers, electrical engineer of the railway, was convinced that money could be saved by liberal use of the automatic substation principle in city work. It will be remembered that Mr. Arnold's was an interurban proposition. Mr. Chambers actually was able to take down many thousands of dollars worth of aluminum feeders, at a time when it commanded an unusually high price. He used "automatics" not only on the city lines but on the Inter Urban Railway as well, until now the lines are almost completely so equipped.

The "automatics" at Des Moines have proved particularly helpful on the line furnishing service to Camp Dodge, which produces enormous traffic. Substations much smaller than could be used with manual operation are handling the business successfully. An article printed in the issue of the *ELECTRIC RAILWAY JOURNAL* for Jan. 13, 1917, page 66, gives details of this installation. There are now thirteen automatics in operation or on order on this property, all but one within the city limits having automatic control. That one will be equipped soon.

Mr. Dorticos said that the flash barrier (see issue of this paper for July 6, page 9) is one of the greatest of recent improvements in the rotary converter for automatic substation. He also referred to a special case of automatic control; but in a railway installation, in which a synchronous condenser, that is, a synchronous motor with heavily overexcited fields, is automatically cut into and out of a circuit to maintain a high power factor. In this case the control is by the variation in power factor.

Following the outline of the "automatic" situation in general Mr. Dorticos answered a number of questions as to details. Among the most interesting points were these: At Minneapolis the Twin City Rapid Transit Company is installing the largest automatic control to

date, on a 1500-kw. machine. The line resistors for this large unit are to be made of steel rails embedded in concrete. At present prices an average control equipment costs about \$4,000 or \$5,000. Lightning has not proved troublesome in the automatic substations so far equipped and there is no more reason that it should do so here than in a manual substation. The aluminum cell arresters appear to furnish ample protection. Daily inspections of substations are desirable, but the amount of attention required is very small, and the labor saving is correspondingly great.

Asked as to the possibility of adapting automatic control to rotaries with induction-motor starters, Mr. Dorticos said that there is no insuperable difficulty in doing this, but during the war he thought that it would not be possible to give the problem the necessary attention. Deliveries of automatic equipment are necessarily slow, even for the standardized apparatus. A suggestion was made as to the use of shunt-wound rotaries in automatic stations and in manual stations subject to overload, with the idea that the drooping voltage characteristics could furnish protection against overload. Mr. Dorticos said that the plan has had favorable consideration and that the action is similar to the operation of the resistance which is cut into the circuit in the automatic substation.

GETTING RESULTS IN THE CLAIMS DEPARTMENT

Following Mr. Dorticos, Harry Rimelspach, claim agent Lake Shore Electric Railway, was called upon for some ideas from the claim department. He began by asking how one could tell when this department is producing results. The answer is given in two ways: First by the testimony of the operating expense report; second, by the conviction that the department is exerting itself to the limit in discharging its duties.

Mr. Rimelspach devoted attention principally to the details of the "real" investigation. Such an investigation is much more extensive than is sometimes supposed. It is not enough merely to get the reports of the crews with lists of witnesses. There is almost no limit to the range of facts which may have a bearing on an accident. The claimant himself is an important source of information.

To illustrate his point the speaker showed how important it is to know the characteristics of the claimant. For example, a claimant may be habitually careless, and it is essential to bring out this point, which may be done without difficulty. A claimant may impute careless habits to a motorman, and it is desirable to learn of the characteristics of the motorman in this way. But it is possible to convince such a claimant that perhaps he, as well as the motorman, may not be free from fault in this connection. While testimony regarding events not related to the accident have no real status, discussion of the accident with the claimant privately may greatly modify his claim.

To make real investigation of accidents and to go into the related questions which have bearing upon them require an ample staff. Obviously an overworked department is obliged to make analyses which are more superficial than is desirable, and in the end this is expensive because what is saved in salaries is lost in excessive awards for claims.

Another point is that the full educational value of claims work should be utilized. When an accident occurs the motorman or conductor responsible should be told of similar accidents that have occurred in the past and what was learned from those accidents. If the accident is a common one he should be told this in the hope that he will endeavor to assist in keeping down the number of repetitions. He should also be told what have been the rulings of the courts in case the accidents have resulted in claims.

Mr. Rimelspach mentioned the fact that, as the testimony of some witnesses is worth much more than that of others, it is essential to impress on crews the importance of noting upon their reports any circumstances which may tend to assist the claims department in utilizing such witnesses. For example, the fact that Mr. Jones sat upon the front seat near the motorman's compartment and was heard to remark, "Well, that certainly wasn't the motorman's fault," may mean much to the claim agent if the motorman will simply jot down a memorandum covering it.

The final point made by the speaker was the necessity for close association between the members of the claim department and the platform men. A knowledge of the characteristics of the latter will help greatly in preventing accidents and in adjusting claims resulting therefrom. This again furnishes an argument for an ample staff in the claims department, for such close association is impossible in an overworked department.

After covering the topic assigned to him Mr. Rimelspach spoke fervently regarding the patriotism of electric railways. He thought it especially important that the railways take an active part in all public movements such as War Savings Stamps campaign, Red Cross work, sale of Liberty Bonds, etc. The patriotism of the railway organization is unquestioned. The present crisis affords an opportunity for an outward manifestation of this. The result will be improved public relations.

ELECTRIC RAILWAYS MUST ADVERTISE

"Every man believes in advertising," said E. R. Kelsey, publicity agent Toledo Railways & Light Company, in beginning his remarks on railway advertising. This is shown in the display of signs over store doorways, and even the wearing of a necktie by a man is advertising in that he wants to make a good impression on the public. This war was "sold" to Great Britain by advertising, and thrift is being sold to this country in the same way. From a country having a dread of "Wall Street" and its doings we now have one made up of bond holders.

The best advertising assets of the electric railway are its own employees, especially those who come into contact with the public. The telephone operator or the platform man has a splendid opportunity as a continual advertisement. Next in value is the space in the cars. People when riding are, as a rule, in a receptive mood; they are not in a hurry as at other times. Hence in the comparative leisure of the car ride there is a chance for advertising to "sink in." Especially valuable for posters is the end window space in cars with bulkheads, or in the front windows in other cars.

As an example of what advertising will do for a utility Mr. Kelsey mentioned a recent campaign in To-

ledo in connection with a prospective increase on heating rates. The advertising was begun early enough to permit householders to put in other heating facilities if they so desired. The situation was also explained to the newspaper men. The result was very satisfactory indeed.

There is great need for advertising now for public good-will and for the rate raising that will be necessary both now and also after the war. A part of the public has the notion that an institution is bad because it is big, and that all rich men are crooks. This notion must be controverted by advertising. There is plenty of fine material available for use in advertising if the men who can use it will only look for it. And an important element in this work is utilizing the psychology of suggestion.

What suggestion is able to do was illustrated by Mr. Kelsey by referring to the work which is being done for disabled soldiers in Canada. Men whose nerves have been ruined apparently and who have come to believe that they cannot move their muscles again are taught to perform their normal functions by means of suggestion. If this is possible, how much easier it should be to convince the public of facts through the use of judicious advertising.

Mr. Kelsey discouraged the notion that advertising can be expected to produce results immediately. Sometimes a railway has a special propaganda to put out and expects to get results from, say, a three-week campaign. This is impossible. Building up good public relations is a slow process, as the work of years cannot be undone in a moment. The safety movement is a great help in this direction, as it furnishes a good excuse for putting real "news stories" in the papers. And they must be new stories to be worth while, or, in fact, to get into the papers. Advertising in the guise of news must never be used, but there is a plenty of good news on any live railway property. For example, in Toledo there are a dozen good stories every day.

Furthermore, good advertising material can be produced by any good salesman (and every successful manager must of necessity be a good salesman) if he will write himself into his copy. An illustration of this was furnished by the controversy between Henry L. Doherty and the City of Toledo. Mr. Doherty prepared a series of advertisements which reflected his personality. As a result when the Toledoans had an opportunity to ride free, 69 per cent voluntarily paid the full 5-cent fare.

In concluding his remarks Mr. Kelsey "made a hit" with his audience by commending the spirit of the meeting, stating that after all it is personal association that is necessary in lubricating the wheels of business. Even if no papers were read, a meeting would be a success if those in attendance got to know each other better. Correspondence is facilitated by personal acquaintance. This meeting was successful even with the program altogether disarranged through circumstances beyond anyone's control, as each one present was willing to do his part. At this point a suggestion was made that future programs be made impromptu in order that the association be brought closer together as had been done at this Thursday session.

After Mr. Kelsey's talk the meeting adjourned to meet at Indianapolis on Thursday, Nov. 21.

Aspects of the Labor Situation

Labor Is Uneasy and Higher Wages Are Necessary—Non-Essential Work Should Be Discarded—Committee Work Is Needed

BY H. A. NICHOLL

General Manager Union Traction Company of Indiana,
Anderson, Ind.

THE labor question confronting the electric railway industry is perplexing and difficult even under ordinary circumstances, but in these strenuous and trying times it is a most difficult matter to handle, and about as important as any other problem. The situation should be considered with reference to the following points: (1) Restlessness of labor due to the unusual activities produced by the war. (2) Necessity of higher wages on account of the increased cost of living. (3) Shortage of man-power on account of the great demand for men in the Army, Navy and manufacturing establishments producing war materials. (4) How can this situation be met satisfactorily to both employer and employee in the electric railway field?

LABOR IS RESTLESS

During the growth of the present industrial activity the demand for labor, both skilled and unskilled, has been tremendous. To fill the necessary requirements, extensive advertising campaigns in many forms have been inaugurated, offering large pay, good living and improved working conditions. This propaganda has been carried on by the government, by large and small corporations, by private individuals and by agricultural interests, until a state of uneasiness in all classes of labor exists in most of our communities. It is with considerable difficulty that men in the electric railway industry are persuaded to stick to their present positions. Companies located in the great manufacturing districts and in places where large government work is being carried on are no doubt most seriously affected. Higher wages look good to the men, even though in many cases they may prove not to be (in the long run) so productive of net results as is their present employment.

Whenever the wage is large, the working conditions are generally arduous and the living expenses high. In general, the farther East one goes, the higher the wages paid and the more attractive seem to be the opportunities for employment. This is accounted for no doubt by the fact that more war munitions and supplies are made in that locality. As the war progresses, however, we may look for a gradual increase, extending to the West, somewhat in proportion to the distribution of munition and government supply orders.

Whenever the Central district loses a man to an Eastern or distant industry, we have to employ another in his place. If this process is carried on to any great extent, a shortage may be produced in our vicinity not easy to overcome with the man-power available in that community. This condition, if aggravated, is likely to encourage proselyting, thus increasing the uneasiness of labor.

Nothing seems so unnecessary and unfair as for one company to send representatives into other sections of the country, either far or near, to induce those already employed, through offers of higher pay or better work-

ing conditions, to leave their present places. It is difficult enough to protect our men from labor agitators and other local industry sharks, without having to fight labor procurers from friendly and associated properties. We should aid one another to create a feeling of contentment among our men that will make it practically impossible for outside inducements to have any appreciable influence on them.

LIVING COSTS HAVE GONE UP

The cost of living no doubt has advanced. Clothing, foodstuffs, medicines and nearly everything used by man has gone up in price. This advance has been most pronounced in the congested centers and in the East, on account of the extensive manufacturing and the inaccessibility of those localities to the great farming and food-producing sections of the country. On account of loss of men and families to the Army, Navy and governmental work, our house rents have not advanced to the same extent, although in some localities in our territory they are considerably higher than heretofore.

To meet this higher cost of living it is but right that higher wages be paid. How much higher is the great question. We should treat this matter with all fairness to the employees and to the properties. In some places higher wages can be paid than in others. Higher wages should be given voluntarily whenever possible, and in all cases the financial condition of the properties must be fully considered.

To be forced to pay higher wages through governmental agencies, without the opportunity to compensate in sufficient amount through raise in fares, would be manifestly inequitable and unjust. Representatives of labor argue that, regardless of the financial ability of the property to pay its obligations, labor should receive higher wages. To me this seems about as unfair as any demand ever made by labor, no thought whatever being given to the future of the properties or the rights of the owners, who may be more in need of protection than the laborers themselves.

To be compelled in any event to standardize the wages in our industry—split up into small units and scattered in all sections of the country—does not seem to be desirable and should not, through any channel of authority, be forced upon us.

MAN-POWER IS SHORT

Half the American nation will be actively engaged in war in another year if the administration sends 2,500,000 or more soldiers to Europe. A like number will also be needed at home for the defense of America, for use in the outlying possessions and in process of training. Approximately ten workers are needed to keep each soldier armed, fed and clothed. This would mean 50,000,000 men, women and children working to supply the army of 5,000,000,000. On the basis of 110,000,000 population—that's half the nation. And the other half will also be indirectly engaged in war work.

There will not be enough men to go around, and the condition will get worse as long as the war continues. Therefore it is necessary to conserve the supply.

After Aug. 1 the United States Employment Service will undertake to be the medium through which employers obtain their unskilled labor. Although the government may be of some service to electric railways

in providing such labor, it will not be of much help unless the companies exhaust every effort to obtain labor and are actually down and out. Even then it appears that if we secure the labor we need, regardless of our ability to pay the price, we will be forced to pay as high a rate as any establishment in our community, notwithstanding the fact that lucrative government orders may be enjoyed by the companies which have established the high wage scale. Furthermore, through this method of securing labor it will only be a question of a short time until it will automatically make certain a standard price for labor.

As patriots we shall have to accept the inevitable and co-operate for the successful operation of this scheme, but it may prove to the electric railway industry an expensive proposition, even if not attended by absolute financial disaster. Increases in fares guarantee more earnings per passenger for a given ride, but they do not guarantee that any number of people will ride. We are somewhat different from other industries in that we may reach a point in production cost that is greater than that which the traffic will bear.

The shortage of labor will cause the quality to decrease until the efficiency will be very greatly lessened through the employment of men above the age of strength and men under age who are frivolous and reckless. Many women will have to be employed in positions not suitable to their natural characteristics. Women, however, can be nicely used as ticket takers, clerks, substation operators, conductors, oilers in power houses, car cleaners, armature winders, etc. In most all of these places they perform their tasks about as well as men do, and in some instances they excel.

WHAT COMPANIES SHOULD DO

We can discard all the non-essentials and reduce the work to be done as much as possible. This does not mean that we should not keep our properties in good operating condition, but we should discard only the frills such as fancy painting on cars, flower beds adjacent to stations, operation of special trains, etc. We should discontinue the operation of two-men cars and replace them with one-man cars wherever possible. We should rearrange our schedules, cut out early and late passenger trips, use machinery instead of men, watch the scrap pile and use old materials whenever it is possible so to do. We should also instill in our men the idea that they should use their heads and thus save their feet. In this way many man-hours can be saved.

We should also assist in the enforcement of General Crowder's "work or fight" order, and see to it that anyone who is capable of fighting does fight or is put to work. The jitney is unnecessary, and the action of the Electric Railway War Board in directing the attention of the government to the duplication of the service through this instrumentality is commendable.

We should do all we consistently can to make our present employees as satisfied and as comfortable as we can so that they will remain in their present places. How are we to make our men satisfied? By giving them a living wage, commensurate with local conditions and finances, and thoroughly fair treatment. They must have

(Continued on page 161)

The Interesting "Flop" of the New Jersey Utility Commission

The Railway Decision of Last Week Represents a Point of View Entirely Opposed to That Expressed in the Earlier Gas Decision of the Same Commission—Opposition in a State to a Fair Return to Capital Will Discourage Investment There

By W. W. HARRIS

Of Lee, Harris & Lee, New York

IT TOOK four months and five days for the Board of Public Utility Commissioners of New Jersey to come to a decision upon the "emergency application" of the Public Service Railway Company for an increase in rates sufficient to meet an estimated deficit of \$3,980,112. The commission granted only \$860,000 (estimated), to be obtained by a 1-cent charge for transfers.

The petition was filed on March 5. The commission's report and order were dated July 10. To state this is not to accuse the commission of dilatoriness. It is, however, one more instance in a very long list which supports the position insisted upon in the *ELECTRIC*

(Continued from page 160)

constant and agreeable work and be supervised by men who can recognize the performance of faithful service and treat employees accordingly. The greater the ability in the supervision, the more efficient will be the work and the better satisfied will be the men.

One way to interest employees is by organizing safety or efficiency committees. The plan should be the means of exciting a spirit of rivalry, loyalty, self-interest and co-operation. The membership of each committee should include employees of all departments. Committee membership should be changed frequently by rotation or some other method, so as to permit as many employees as possible to serve for a reasonable time.

It is of course desirable to have certain permanent members on the committees, who may be sub-heads of departments, division superintendents, etc., these men to be used for the instruction and guidance of other members in their work. In making individual appointments, it is desirable not only to appoint men who are already interested in their work, but also to appoint some employees whose interest is lukewarm, in the hope of securing greater co-operation.

The work of these committees should consist largely in handling and acting upon suggestions from their own members and from other employees. The committees should report, through their representatives, to a managing board composed of heads of departments and officers of the company. This is desirable in order that suggestions of a general nature, coming from the committees, may be handled without autocratic settlement by the management.

The appointment of committees of this kind tends to democratize the operation of the property and furthers the co-operative management idea. This is not an undesirable condition, in these days when the value of democracy to the world is being so prominently placed before us.

RAILWAY JOURNAL, that the present system of public utility regulation is altogether too ponderous.

True, the Public Service Railway is a very large corporation, one of the largest of its kind in the United States. It serves 146 municipalities in the State of New Jersey. True, again, without pretending to point out wherein the blame lies, the Public Service Railway has had to meet a most formidable public opposition.

It seems likely that the heat of the campaign for a seat in the United States Senate now raging in New Jersey has not made for less strife, particularly since one of the leading counsel in opposition to an increase in rates, George L. Record, is a candidate for the Senate on the government ownership and operation platform.

The circumstances which have surrounded the adjudication of this case may properly be pointed out because the ultimate decision of the commission in refusing the major part of the requested relief can, it would seem, be understood only in the light of the complete picture.

The finding of the commission contains one paragraph of extreme importance. This paragraph to the lay reader of the East is in such striking contrast with the paragraph upon the same subject—the right of stockholders in public utilities to dividends—in a prior decision of the commission as to indicate a reaction upon the commission of the active and at times bitter public opposition to the petitioning corporation, an opposition which, in the heat of the political campaign now in progress, has not been overlooked by aspiring candidates.

Throughout the country there has come a public opinion more generally appreciative of the truth that included in the "cost of service" is the item of dividends. This has been recognized repeatedly in official utterances of commissions. Ex-President Taft, commenting upon the report of the Railroads' Securities Commission, noted the necessity of a reasonable return to the owners of capital invested in public utilities. He said "a reasonable return is one which, under an honest accounting and responsible management, will attract the amount of investors' money needed for the development of facilities. * * * Less than this means a check to railroad construction and to the development of traffic."

Now note the two points of view of the New Jersey Commission. In a report made on Feb. 27, 1918, in the emergency petition of the Public Service Electric Company for an increase in rates, are these words:

In the present financial situation, the public has a vital interest in maintaining the fund available for dividends on the stock of the company. * * * A material decrease in dividends would not only result in preventing the free flow of new capital, but would materially depreciate the

market value of outstanding securities. This possible shrinkage in the value and marketability of such securities would tend to undermine confidence and render unstable security markets. Such a condition would have direct influence upon the securing of money by the national government for war purposes. The required funds for these purposes must be yielded by operating revenues. In the broad view, the public interest requires it. [The italics are those of the writer.]

The contrast between that thought and the principle enunciated in the report upon the Public Service Railway application is even startling. The company in its application said that it ought to be restored at least to its financial condition of 1916, at which time it was paying some, but not complete, dividends. The commission replies:

We must * * * maintain our declared policy of disallowing rates in war times for purposes of increasing dividends. Stockholders in such corporations must share the burdens and hardships resulting from financial changes due to the war and cannot expect to wholly escape therefrom. * * *

In this statement there is no distinction whatever between war profits and fair return, no recognition of the fact that electric railway companies have "shared the burden" more than almost any other form of business, even to the point, in many cases, of absolute bankruptcy.

The board, after explaining that a formal rate case was for the determination of rates which would give "a fair return upon the fair value of the property used and useful in the public service," said that such a valuation in an "emergency case" was unnecessary. All that was needed was to meet a temporary emergency. Such an emergency it defined as follows:

An emergency for which a carrier is entitled to relief by a temporary emergency rate exists where, by reason of general conditions not affecting the applicant utility alone, operating revenues are insufficient to operate and maintain its property and to pay rentals and interest on such of its securities, a default in the payment of which would jeopardize the solvency of the company.

In short, the commission to all intents and purposes plants itself firmly upon the proposition that, in war time, the basic principle of "fair return" upon which the public service commission law is written, is *suspended*:

CAPITAL CANNOT BE COERCED

It is not the purpose here to argue the soundness or unsoundness of this conclusion. We merely call attention to the contrast of ideas in the two reports. It is pertinent as bearing upon the future willingness of capital to help develop the public utilities in the State of New Jersey. For while it is possible to deprive the investor of returns upon capital which has already been put into business, it is not possible to force him to take another chance of the same sort. Capital must be attracted, it cannot be coerced.

One of the major risks which an investor in public utilities must take into calculation is the risk of disregard by commissions of the immutable laws affecting the flow of capital.

True, the New Jersey Commission announced that any issuance of securities by this company was not immediately pending, as though a public utility in a growing community ever attained its full growth. Whether or not this implied that they might have to come to a definite conclusion, were such an issue to be immediately desirable, can only be conjectured. But

there can be no doubt whatever that capital will take into its calculations the factor of the state of mind of any commission which announces its policy in such unmistakable terms.

VIEWS NOT SO INIMICAL IN OTHER STATES

Meantime, if one may come to a fair judgment of the real state of mind of New Jersey toward the street railways and public utilities generally from the quotations from the press, that State is fallow ground for the seeds of education through intelligent publicity. New Jersey seems to be in an attitude of opposition, not to say animosity, toward public utilities. It seems to regard any added burden which can be put upon the utility, either by increase of taxation or by reduction of revenue, as "a victory for the people."

The real value of the service rendered by the public utility does not seem to be the uppermost thought. The thought that the hampering of service and reduction of its quality may be the necessary result of a general corporation baiting has not been strikingly apparent in the columns of the Jersey press.

The Grand Rapids Press recently said, "We may not love the utilities, but we need them, and to allow them to suspend their usual function would be fatal." One might remark, "New Jersey papers please copy."

New Jersey seems to be in that stage of its education in relation to the utilities which Massachusetts has only just passed through. In Massachusetts, however, a general sanity of view has succeeded the period of hysteria. As an instance, the Boston Elevated Railway, which is now in charge of State trustees appointed by the Governor as representatives of the people, has long met an unreasoning popular opposition to any proposition to raise the 5-cent fare, even though it was perfectly apparent that the Boston Elevated Railway was in the last financial throes.

Now the State trustees have announced that the 5-cent fare will not meet the bills. First it was declared that the fare probably would have to be raised to 7 cents. Now it is announced that the needs of the elevated railway indicate a fare of 8 cents before many weeks. This announcement has been received without any public protest whatever.

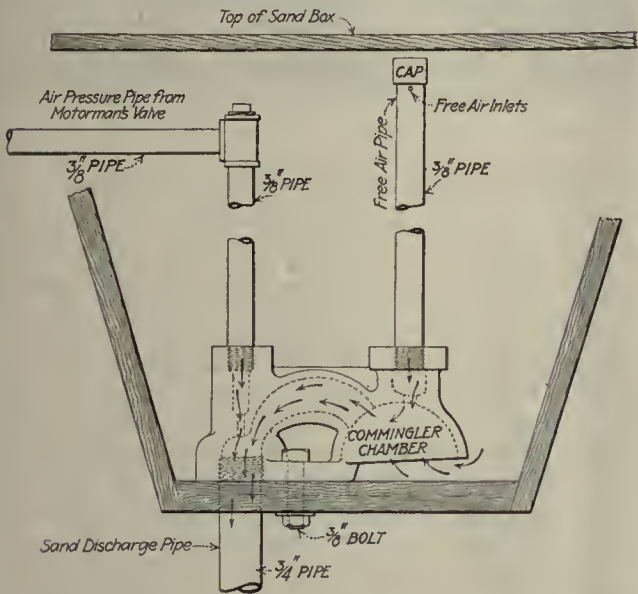
Commenting upon this prospect, the Boston Record says: "The public would prefer an 8-cent fare if that would guarantee good service to a 6 or even a 7-cent fare with service not materially better than that now given."

The Transcript says: "The public needs to remember that an 8-cent fare is the toll that it will be shortly called upon to pay, because here in Boston the general care is to set up for our street-car system a reign of justice and common sense which does not seek to pour money out of the system's treasury until none remains and at the same time refuse to pour in new money. Other American cities still cling to this strange mode of procedure and they are in a fair way to witness a complete crash of their electric railway companies."

In short, the future of public utilities in New Jersey will be just as interesting and as important as the immediate past. In that future a widespread and intelligent publicity, that seems in the main to have been neglected, can play a most important part in arriving at a situation of sanity and common sense.

Pneumatic Sander Readily Applicable to Existing Sand Boxes

A NEW FORM of pneumatic track sander for use on electric cars has been placed on the market by the National Railway Appliance Company, New York. The accompanying illustration shows this sander applied to the sand box of an electric car. The design permits of



PITT PNEUMATIC TRACK SANDER AS APPLIED TO THE SAND BOX OF AN ELECTRIC CAR

such an application without changing the usual type of sand box used.

All of the working parts of the sander are included in one casting which is bolted to the bottom of the sand box. Three outlets are provided in the casting for connecting the necessary piping. The air pressure pipe is connected to the top left-hand side, as shown in the illustration, and runs to the main air supply. This can be connected either to the emergency brake pipe at the motorman's valve, so that air will be supplied for operating the sander whenever the brake handle is thrown to emergency position, or the connection can be made through a sander valve to be operated by the motorman

as desired. A combination of these two methods is recommended.

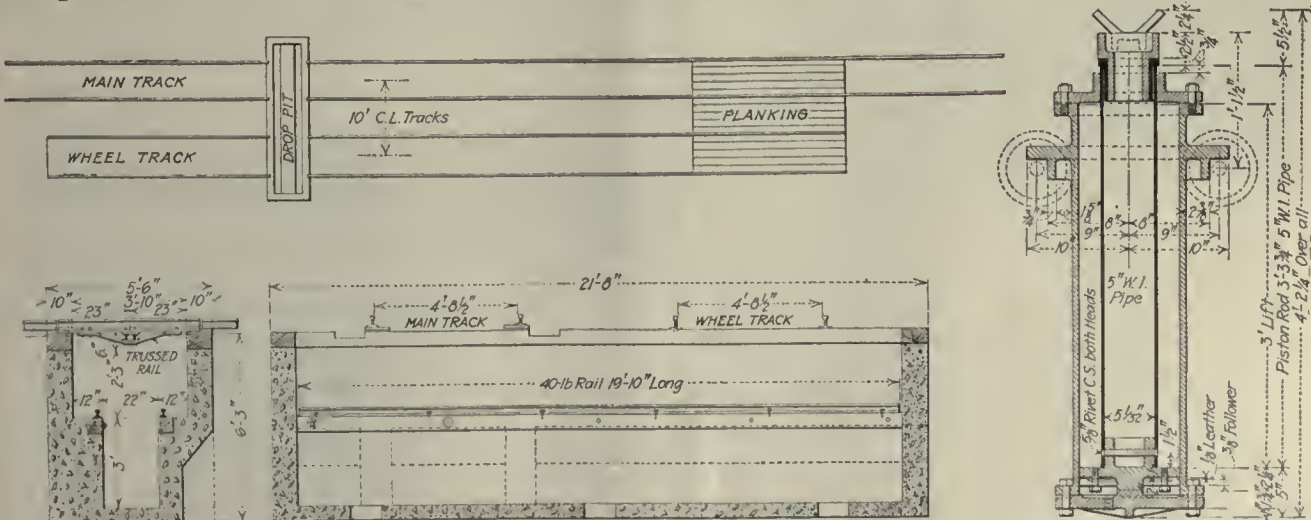
The connection for sand discharge is made at the bottom left-hand side. This pipe is run through the bottom of the sand box to a point as close to the truck center pin as possible. A flexible hose connects this with the discharge pipe which conducts the sand to the front of the wheel. A free-air intake pipe is connected to the casting at the top right-hand side. This pipe should be of sufficient length to reach to the top of the sand box and is provided with a cap and holes drilled just below it to admit free air.

The operation of the sander consists of admitting air under pressure through the intake pipe. This passes through a nozzle or reducing discharge port into the larger sand discharge pipe leading to the rails. The expansion of the air as it leaves the reduced orifice causes a suction of air through the passage from the commingler chamber of the casting. The sand enters this commingler chamber through a passage provided at the bottom, and when air is being drawn out a circulation of air occurs through the free air pipe. This air passes over the top of the sand, lifting the grains individually, and its action thus prevents clogging should the sand be wet. The openings through the casting are so proportioned that any large pebbles which may be in the sand cannot enter the commingler chamber, and small pebbles are carried through by the action of the air.

Car Wheel Drop Pit Saves Time and Expense

By F. G. LISTER
Mechanical Engineer, El Paso & Southwestern System

THE car wheel drop pit shown in the accompanying illustration has been in use at the various terminals of the El Paso & Southwestern System for about three years. It has proved to be a means of saving much time and expense in removing and replacing car wheels, as it does away with the necessity for jacking up the car and trucks when wheels are to be changed. Sufficient details are given so that a similar drop pit can be constructed by electric roads where desired. The particular construction shown, being for steam road use, may be somewhat heavier



ARRANGEMENT OF DROP PIT FOR REMOVING WHEELS AT THE TERMINAL OF THE EL PASO & SOUTHWESTERN SYSTEM, AND STANDARD 10 x 36-IN. DROP PIT JACK USED FOR REMOVING CAR WHEELS

than would be necessary for the average small electric road but this can be arranged to suit conditions.

The essential features of the construction consist of a pit 3 ft. 10 in. wide by 2 ft. 9 in. deep which is bridged by two trussed rails in the track. A wheel track to facilitate the bringing of wheels to the pit and removing them for repair is located alongside the main track and the pit connects these two.

At the bottom of the pit and extending across these two tracks is another narrow-gage track. A jack provided with wheels to support it and to facilitate its movement runs on this track. To remove a pair of wheels from a car it is only necessary to run the car across the pit until the wheels which it is desired to remove rest on the center of the trussed rails. The jack is then run underneath the car and raised to support the wheels and lift them slightly so that the trussed rails can be removed. The jack is then lowered with the wheels and run along its track until in line with the wheel track where it is again raised, and by applying the trussed rails to the wheel track the wheels can be rolled out of the way. The jack is operated by compressed air.

Mounting an Air Hoist in the Door Jamb

CONVENIENCE in handling wheels in an old electric railway repair shop is obtained by the 1-ton Imperial air hoist shown herewith, the hoist being mounted on an 8-ft. 1-beam boom and arranged to swing



AIR HOIST HANDLING WHEELS THROUGH DOOR OPENING

from a center-bearing bolted to the door jamb. The I-beam is 6 in. deep, and a 3-in. vertical rod ties the brackets together at the top and bottom of the suspension. The I-beam is reinforced by a 1-in. rod with turnbuckle adjustment in the middle, and the door jamb was reinforced by 1-in. planking where the bolts were carried through the wall. The hoist is provided with a double drum equipped with $\frac{1}{2}$ -in. stranded steel cable, air being supplied through a $\frac{3}{4}$ -in. hose.

With this equipment a pair of wheels can be removed from a truck outside the carhouse and swing into place on the pit track inside the building within a comparatively few seconds, and when not in service between the inside and outside of the building the door can be closed without interference with the interior use of the equipment. A similar mounting for a hoist at the door of a shop supply car will be found of great convenience in handling material which can be picked up alongside the track and readily swung into the car.



LOCK ATTACHED TO SWITCH ON INTERURBAN TRACK

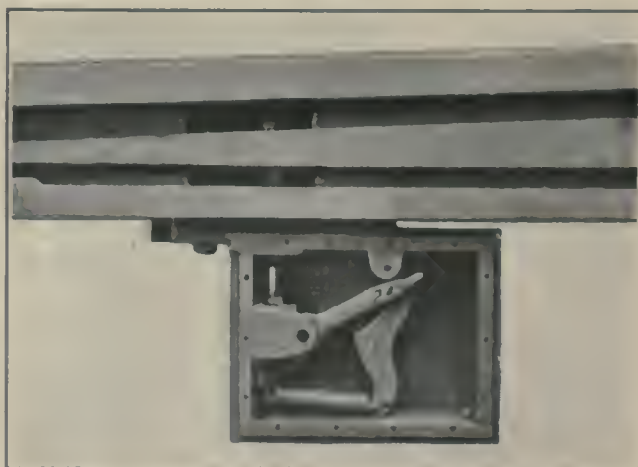
Switch Lock Prevents Derailments

THE Weiss switch lock, which is being used by a large number of electric railways, has been adopted by the Illinois Traction System, Peoria, Ill., for all necessary replacements and new installations.

The device, which is shown in the accompanying illustrations, locks the switch positively both right and left and thus prevents splitting of switches. It is claimed that this switch lock is absolutely waterproof, non-freezable, dirt and sand proof. On the Illinois Traction System it is used both in paved city streets and on open interurban track. It requires no attention and stands up well under the most severe conditions.

The simplicity of the device is readily apparent from the illustrations. When the switch is thrown arm 2 shifts from left to right or *vice versa*, and it is held firmly in position by arm 1 and the spring. The only breakable part is the spring, and this can be readily renewed. When the spring is broken the switch remains in good working order minus the locking feature.

The box is filled with oil and the inner lid rests on a gasket and is secured by bolts. Where the connecting rod to the switch passes out of the box, a stuffing-box is provided. Thus the box is rendered absolutely tight and the loss of oil and the entrance of water or dirt are prevented. A thick casting fits snugly over the inner lid and prevents damage from traffic. These locks can be made to fit any switch by changing the position of the fastening casting on the side to correspond with the position of the bolt holes in the rails. All parts in the lock thus remain standard for the various sizes. This lock is made by the Weiss Switch-lock Company, Springfield, Ill.



SWITCH LOCK PARTS AND CONNECTIONS TO RAIL

News of the Electric Railways

TRAFFIC AND TRANSPORTATION

FINANCIAL AND CORPORATE • PERSONAL MENTION • CONSTRUCTION NEWS

Short Strike in Atlanta

Men Resume Work on Understanding that Matters Shall Go Before War Labor Board

The Atlanta strike has been settled by an agreement between the employees of the Georgia Railway & Power Company and P. S. Arkwright, the president, reached late on the night of July 19. The regular schedule of cars was resumed early the next morning.

SERVICE SUSPENDED FOUR DAYS

For four days the entire railway and interurban system of the company was tied up, with the exception of cars between Camp Gordon, Fort McPherson, and Camp Jesup. These cars were operated by employees who had not struck.

At first the strikers contended that they had walked out because Mr. Arkwright would not reinstate and employ men who in 1916 had stopped work or who had participated with the disturbing element in dynamiting and other depredations. Later the strikers contended they wanted higher wages and better working conditions. Although these last-named reasons were entirely different from the ones first announced, Mr. Arkwright agreed to include them for arbitration before the War Labor Board.

During the strike, the men were urged to return to work by a representative of the War Labor Board, but this request was ignored. After Major Peck of the United States Army addressed the men, the executive committee agreed to a conference with Governor Dorsey and Mr. Arkwright. This conference finally culminated in an agreement drawn up by Governor Dorsey, Mr. Arkwright and Major Peck. The main points of this agreement follow:

RIGHT TO ORGANIZE CONCEDED

"We agree that said controversy shall be submitted to the National War Labor Board for adjudication.

"All matters in dispute, which shall include among other things hours of labor, wages and working conditions, reinstatement of former employees and any and all points offered for consideration by either side, shall be decided by the National War Labor Board and both parties to this agreement will abide by said board's decision, with the following exceptions:

"1. The organization of a union known as Local No. 732 is recognized, a number of the employees of the company having affiliated with that union.

"2. The right of the employees to join this union and to affiliate with same is conceded.

"3. The right of the Georgia Railway

& Power Company to maintain an open shop, to retain its non-union employees and to employ men in the future who are not union men is conceded.

"All other matters now in dispute or differences which may arise in the future are to be adjudicated by the National War Labor Board, and the board's decision shall be binding upon both parties for the duration of the war.

"Upon the signing of this agreement by both parties to the controversy, it is agreed that the employees of the company shall return to work in the positions they held when they struck, and with the same rights, pending the decision of the War Labor Board."

While both sides are apparently satisfied, opinion prevails that the company has won its point, in not treating with the representative of the Amalgamated or other heads of allied trade unions, as the final agreement was executed by Mr. Arkwright and employees of the company, a point for which he had held out from the beginning.

President McCarter's Comment

The decision of the Board of Public Utility Commissioners of New Jersey in the fare case of the Public Service Railway has resulted in a lively passage at arms between President Thomas N. McCarter of the company, the members of the board and the Governor of the State. In an interview with two daily newspaper reporters, Mr. McCarter was said to have used the term "political horse thieves" in referring to the commission. The Governor in a reply deplored the tendency, which he said was growing, on the part of losing litigants, to abuse the judge, and said that "the decision undoubtedly represents its best judgment." It developed later that Mr. McCarter did not expect or intend that his remarks be quoted.

On July 24 during the hearing on the application of the Public Service Railroad, a separate proceeding from that of the Public Service Railway, for an increase in fares, while making it plain that he desired to apologize for the attack on the commissioners, Mr. McCarter declared that he did not desire to retract his criticism of the report of the commission. He declared the decision was not in accord with the evidence submitted at the hearings and practically ruined the credit of the company. He asked permission to file the statement as part of the board's records, which was granted.

In accepting the apology, Mr. Slocum, president of the board, said:

"This board expects to be criticised. It occupies a very difficult position, but it does hope for and always expects to receive fair and constructive criticism."

Promoting Patriotism

Local Safety Council at Kansas City Reaches Workers—Ed. Kelsey, Toledo, Does His Bit

The question of how industrial workers can be inspired to loyal service during the war the way that business men are inspired in their many war meetings was answered by the Local Safety Council in Kansas City, Mo., by a meeting in Convention Hall, admission being by tickets distributed only to employees of industrial plants. Speakers on war subjects delivered patriotic addresses, and a noted speaker on safety coupled these war talks with the obligation of men and women to keep the wheels moving.

MANY PROMINENT MEN SPEAK

The local Safety Council took advantage of the International Rotary Convention, in Kansas City that week, to hold the meeting on June 26. The Rotarians arranged for three speakers, who readily agreed to take part. These were Frank Hering, editor of the magazine of the Eagles' organization; E. R. Kelsey, advertising manager of the Toledo Railways & Light Company, Toledo, Ohio, and Andrew Home-Morton, past-president of the British Association of Rotary Clubs. Mr. Hering has been devoting nearly all his time to war work. Mr. Kelsey has been "loaned" by the Toledo utility almost continuously during the past year for Liberty Bond, Red Cross, and War Chest activities in that city, and has been largely responsible, through his organization talent and his ability as a speaker, for the success of those campaigns. Mr. Home-Morton is in the thick of similar work, besides assisting in industrial arrangements, in Great Britain.

The Safety Council secured Isaiah Hale, commissioner of safety of the Santa Fé Railroad, to make the direct appeal to the employees to stick faithfully to their jobs as a means of quickly ending the war.

5000 IN ATTENDANCE

Convention Hall was engaged for the event. More than 5000 men, women and children are estimated to have been present at the meeting. Boy Scouts assisted fifty representatives of the various plants in ushering. The purpose of the meeting was to arouse the interest of the several local branches of national projects such as the Americanization movement, the American Protective League, the educational division of the federal department of labor, the conference committee on national preparedness. The event was considered highly successful.

Mayor Hanson More Moderate

Seattle's Chief Executive Inclined to Discard Unbending Policy for One More Reasonable

As a preliminary move toward an amicable agreement between the city of Seattle, Wash., and the Puget Sound Traction, Light & Power Company, looking toward the improvement of railway service in the city, the company recently paid to the city \$145,141, or 2 per cent of the gross earnings of the company for 1916 and 1917, together with interest. In making the payment, the company waives its right of appeal to the Supreme Court of the United States.

OUTLINE OF TENTATIVE AGREEMENT

In return, Mayor Hanson has sent to A. W. Leonard, president of the company, a communication outlining points in a tentative agreement and making concessions in the way of relieving the company of certain franchise obligations. Both actions are the result of the conferences lasting over a week between city officials and officers of the railway. The principal points outlined in the Mayor's letter, covering concessions the city is willing to grant, are as follows:

Skip stops on the various lines of the company.

Elimination of automobile parking on First, Second, Third and Fourth Avenues and on Pike and Pine Streets, where necessary to facilitate railway service.

Common-user privileges on the Fifteenth Avenue North Bridge in exchange for common-user rights of the company's tracks at other points.

Universal transfers on a fifty-fifty basis.

Use of idle cars in return for similar privilege.

Interchange of electric power in time of emergency.

Better arrangement for school and shopping hours.

Discontinuance of service on lines now operated solely to preserve franchise rights.

Relief from paying obligations, except where necessary for safety, during the period of the war.

Relief from \$100,000 of construction obligations.

CONCESSIONS BY THE COMPANY

In return for these concessions, the city asks the following of the company:

Increased wages of employees to meet wage scale of municipal lines.

Payment of 2 per cent gross tax without protest (which has now been done).

Employment of sufficient men to operate all cars.

Purchase of more cars if necessary to give efficient service.

Agreement to divide equally between employees and company all profits in excess of 4 per cent on its own valuation figures of \$15,000,000.

In his letter to the Mayor, A. W.

Leonard, president of the company, agrees to the payment of gross earnings tax without protest; to paving between tracks where the city deems it necessary; universal transfers, provided a proper aggregate fare is charged; mutual use of idle equipment; common-user privileges, with the provision that the values of the common-user privileges granted by either party shall be substantially equivalent, and that the owner of the tracks in each case will have a prior right to use whenever traffic conditions warrant it.

The company requests that the matter of increased fares and of increased wages to trainmen be referred to the National War Labor Board for settlement, and that both parties agree to abide by the board's decision. President Leonard states if the company pays the city scale of wages to its employees, the sum of \$600,000 a year would be added to the payroll when all the company's cars are put in service. Mr. Leonard also states that the proposed charge of 1 cent for transfers would add not to exceed \$150,000 to the company's annual earnings. Mayor Hanson estimates the increased payroll would amount to \$430,000 yearly, based on the company's payroll for May. The city committee, headed by Mayor Hanson, figures that skip stops would save the company \$200,000 a year; elimination of automobile parking at certain corners another \$100,000, while the paving obligations from which the company would be relieved will amount to \$30,000.

WAGE DEMAND A PROBLEM

The most important obstacle in the way of an agreement on the railway question in Seattle is the demand for wage increases ranging from 33½ to 50 per cent for trainmen, shopmen, barnmen and other employees. The proposed new working agreement has been presented to President Leonard. In addition to increases in wages in every branch of the railway service, the proposed agreement provides for a small reduction in the working day.

In a conference in the Council chambers on July 11 it was decided to appoint two accountants to check the books of the company for the last four years. The findings of the accountants will be the basis of a decision in regard to increased fares for the company and additional wages for the trainmen. If an agreement cannot be reached between the city and the company on these two matters, the entire question will be referred to the National War Labor Board.

The city has announced that it will grant such increase in revenue as is necessary to give the company the same percentage of earnings as shown in 1913, 1914, 1915, 1916 and 1917. All other questions under consideration

have been agreed to by both parties. Mayor Hanson has urged the Council to agree to some plan whereby the present controversy may be settled without any action on the part of the government.

A new twist to the railway situation in the city developed when the employees of the municipal system presented a demand to Mayor Hanson for a new wage scale, calling for a 10 to 50 per cent increase. The present city scale is a flat 50 cents an hour for eight hours' work. The new scale asked for fixes the rate at from 55 to 75 cents an hour. There are less than seventy-five municipal line employees. As the negotiations during the last two weeks between city and railway officials have had as one of their objects the fixing of a wage scale for traction company employees equal to that of municipal line employees, the new feature of the controversy may have an important bearing on the general railway situation.

Adjournment Deferred

Chicago Council Will Not Quit Until Report Is Made on Pending Railway Merger Ordinance

Members of the City Council of Chicago voted on July 17 to defer adjournment until a report is received from the local transportation committee on the pending ordinance for the merger of the surface and elevated lines. This gave new hope of getting action on the measure, and the committee has been holding frequent sessions. It is likely that a completed draft will be recommended about Aug. 1.

The Fisher plan for operation of the combined system by a public trustee corporation has found many supporters, and most of the newspapers are urging a settlement along this line. Leonard A. Busby, president of the Chicago City Railway, said he realized that a trustee plan would result in greater public confidence, and if an ordinance could be worked out with assurance of protection for the investors he would not oppose it. The principal debate has been on the rate of return to be guaranteed. The Traction & Subway Commission in 1916 recommended a return of 6.95 per cent. The Council committee cut this down to 6.35 per cent, which was finally accepted by the companies. The Fisher plan proposes an average guarantee of 5 per cent on bonds and 7 per cent on capital stock (one-third of the total securities), making an average of 5.6 per cent. The companies insisted that the investors would not consider this proposition, and conferences are being held in the hope of getting a higher rate on the securities.

A public hearing was held on July 20 at which requests were made for various extensions of the rapid transit lines. Advocates of municipal ownership also argued for a settlement involving this theory, and giving second choice to the trustee plan of public operation.

As Mr. Mahon Sees It

Amalgamated Association President Shows How Fares and Wages Are One and Inseparable

William D. Mahon, president of the Amalgamated Association of Street & Electric Railway Employees of America, was interviewed by John J. Leary, Jr., for the New York *Tribune* of July 21 on the electric railway labor and fare problems. Mr. Mahon was quoted in part as follows:

STRIKES NOT A REMEDY

"Looked at from any angle, the position of the traction companies from one end of the country to the other is serious. They have got to get more money. The only way they can get it is through permission to charge higher fares. It is not a question of paying dividends; it is a question of keeping the companies going and paying the necessary operating costs. It is not a question of caring for the stockholders; it is a question of protecting the public.

"It is no longer with us a question of striking to get more wages for our men. The big question has been to get the men to stay in traction work. In some of the larger cities railway men with twenty years' service have left in droves to work in other lines. It is not a question of choice with them; it is a question of getting enough to live on. The best that we have been able to do is to refer all the cases as they come up to the War Labor Board. Otherwise there would have been strikes all over the country.

"When we ask more money for the men, the companies come back at us and say they have not got the money—that they are not getting the revenues. In the majority of cases we know this to be true. The question, What are they going to do about it? comes up.

"We can call strikes or permit the men to strike—yes. That will not remedy the situation. We can allow the men to drift into other lines of work. That will not remedy the situation. Well, then, what are you going to do? If you dig into the situation you find that the companies, paying more for fuel and all that they use, are actually cramped for money. They are in the same position as the men—their cost of living has increased enormously. They ask for more money, for permission to charge higher fares, and there they stop.

THE BUFFALO FIASCO

"Take the case in Buffalo as an example. There the Council sent the question of increased fares to the Public Service Commission. The Public Service Commission passed the buck back to the Council, and now the court has held that the question must be decided by a referendum vote. Can you imagine people voting to pay more car fare? If, however, they want to ride they will have to. Whether or not these properties are forced into the

hands of receivers, in the end the higher rates will have to be granted.

"My primary interest in the matter is that of the men. But we have got to be fair with the owners of these properties. They are entitled to some consideration. We have got to look out for the public interest. The public needs the services of the electric railway companies.

"Whatever our relations with the companies have been in the past, we find ourselves to-day in the position where we must, as a matter of justice and fair play, support their demands for higher rates. You can't get blood out of a turnip and you can't get money out of a company that has not got it. There is a limit.

"These companies have got to get more money, just as the government has found it necessary to give more money to the steam roads. It is the same proposition, exactly. The same elements which enter into the rising cost of steam transportation enter into the case of the traction companies. The cases are on all fours.

HIGHER RATES MUST COME

"And if they don't the result will be the breaking down of the traction service of the country. But that result won't come. It cannot be allowed to come. The service of these companies is a matter of public necessity, of war necessity, if you please, and as a matter of public necessity, of public policy, higher rates will have to be allowed sooner or later. The sooner they are allowed the better it will be for everybody."

Wage Increase in Baltimore

For the sixth time in as many years the United Railways & Electric Company, Baltimore, on July 11 raised the scale of wages of its motormen and conductors, shopmen and employees in certain other branches of the service. This increase, like each of those that preceded it, was voluntary on the part of the company. The percentage of increase in the pay of the employees under the new scale is from 10 to 20 per cent above the rate paid prior to July 11, and is the greatest increase ever made in railway men's wages in the city of Baltimore.

Officials of the company were prompted to make the raise at this time through consideration of the high cost of living and the desire of the management to enable its faithful employees to keep abreast as near as possible with the steadily advancing prices of everything under the influence of war.

The new schedule of wages per hour for conductors and motormen is as follows: Thirty-five cents, first year; 36 cents, second year; 37 cents, third year; 38 cents, fourth year; 39 cents, fifth year; 40 cents, sixth year.

In wages the operating expenses of the United Railways & Electric Company have increased more than \$1,500,000 per annum over 1915.

Wage Award Expected Soon

Hearings Are Understood to Be Nearing Completion in Cases Affecting Electric Railway Employees

Hearings in the wage cases of the Chicago surface and elevated lines were concluded on July 22 before William H. Taft and Frank P. Walsh, joint chairmen of the War Labor Board. Later the chairmen heard arguments in the case of the Public Service Corporation of New Jersey. On July 23 arguments in the cases of the companies in Boston and Providence were heard by alternates appointed by Messrs. Taft and Walsh. Decisions in most of the pending cases were expected on July 22, but it was announced that none probably would be handed down before July 29.

FORTY-CENT MINIMUM

The War Board of the American Electric Railway Association has issued a pamphlet giving a summary of decisions handed down to July 12 in various industrial cases. The basic awards were a 40-cent minimum wage and an eight-hour day, with time and a half for overtime and double time for Sundays and holidays. The wage question was ruled upon in industrial cases in Waynesboro, Pa., and that of working hours in East Cambridge, Mass., and Buffalo, N. Y., controversies.

In connection with the Waynesboro award the board announces that it has under consideration the matter of determining the living wage, which under its principles must be the minimum wage for the worker and family to subsist in reasonable health and comfort.

Oscar Straus, chairman of the Public Service Commission for the First District of New York, sent a telegram on July 23 to Messrs. Taft and Walsh, in part, as follows:

STRAUS OPPOSES FEDERAL RATE RELIEF

"This commission has adopted a policy of granting public utilities such relief for the war period as may be necessary to conserve the usual corporate income, and request that we be promptly advised of any recommendations by your board affecting the wages of employees on or the rates chargeable by lines and companies within the city of New York. We believe that a policy of recommendations by your board to the proper State and municipal authorities will prove effective wherever the facts require rate increases."

The fare on surface, subway and elevated lines in New York City is not directly involved in any proceeding before the War Labor Board. Moreover, the commission's "policy" of granting war relief to utilities has not been followed in connection with metropolitan electric railways, for under the existing regulatory law the commission is powerless to change franchise fares. Its counsel, however, has submitted to the War Labor Board a brief declaring that Congress has not conferred on the President the power to regulate the rates of intraurban and intrastate elec-

tric railways operated for non-military purposes, but saying the presidential or federal recommendations would doubtless be heeded by State and municipal authorities.

News Notes

City Would Lease Line.—The City Council of Portland, Ore., has decided to ask the Hill railroad interests to fix a valuation on the old United Railways line to Linnton, which will be used as a basis either for purchase or lease of the line by the city. The Council favors the lease of the line, with an option to purchase.

P. R. T. to Open Hog Island Line.—Emergency Fleet Corporation transportation officials are working night and day in an effort to have ready for full operation the new extension of the Philadelphia (Pa.) Rapid Transit Company to the Hog Island Shipyard by the time of the first launching. This event is now scheduled for Aug. 4 and it is planned to accompany it with rather elaborate ceremonies.

Henderson Company Resumes Service.—The differences between the City Council of Henderson, Ky., and the officials of the Henderson Traction Company, have been adjusted, and railway service was resumed on July 20. The company agreed to confess to judgment for oil taxes due and give notes in payment of same. The city ordered current shut off on July 1 because of a disagreement with the company over the matter of paying the oiling tax amounting to \$3,000.

State Passes Ownership Bill.—A bill has passed both Houses of the Louisiana Legislature authorizing cities, towns and villages in the State to co-operate with each other for the purpose of building, owning and operating electric interurban railways and also to build the necessary electric plants to run them. The purpose, it is said, is to give opportunity to furnish cheap and fast transportation facilities all over Louisiana.

New York Commission Moves.—The last of the many bureaus of the Public Service Commission for the First District of New York were moved on July 15 from the commission's old headquarters at 120 Broadway to 49 Lafayette Street, New York City. The new building is twelve stories high, and the commissioners have taken the top floor for themselves, their secretaries and stenographers. Other secretaries and the more important clerks occupy the eleventh floor, while the floors below are used by the various bureaus and engineers.

Haig Honors Canadian Railway Man.—Among those included in a recent list

of officers mentioned in dispatches by Sir Douglas Haig for conspicuous work in France was Lieut. C. E. Knox, son of R. R. Knox, traffic superintendent of the Winnipeg (Man.) Electric Railway. Lieutenant Knox has been in France for the last two years, having left with the 101st Battalion. His entire platoon was made up of conductors and motormen. Before going overseas Lieutenant Knox was in the employ of the Winnipeg Electric Railway as chief clerk to his father.

Portland Wage Contract Ratified.—At a recent special meeting the local branch of the Amalgamated Association at Portland, Ore., ratified the proposed new contract with the Portland Railway, Light & Power Company, and upon the declaration of Franklin T. Griffith, president, that the company would be unable to grant the proposed wage increases without additional revenue, it was mutually agreed that the entire issue be passed to the National War Labor Board for adjudication. If the War Board approves the tentative wage schedule, it is considered probable that fares in Portland will be raised to 7 or even 8 cents.

Campaign for Help Obtains Results.—The labor problem is a difficult one at present with the electric railways operating in the great industrial districts centered in the upper part of the Ohio River Valley. As a means of increasing its available labor supply, the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, shortly after the promulgation of General Crowder's "work or fight" order ran a series of advertisements in the local press calling attention to the essential nature of electric railway work. As a result of this advertising campaign the company received a number of applications for employment.

Pacific Electric Injunction Sustained.—The United States District Court at Los Angeles, Cal., has sustained the temporary injunction restraining officials of the Brotherhood of Railway Trainmen and Brotherhood of Locomotive Engineers from interfering with the operation of the Pacific Electric Railway. In handing down the decision, Judge Bledsoe classed the union organizers as third parties attempting to interfere with a fixed policy of the railway in dealing with its men. It is understood that this will have the effect of permanently restraining attempts to force recognition of the union or the use of intimidation in inducing employees to join in a walkout.

Artillery Officers' School for Technical Men.—A field artillery officers' training school has been established at Camp Zachary Taylor, near Louisville, Ky., and an opportunity is offered there for men with engineering training to become officers in this branch of the service. The camp is designed for civilians between twenty years and eight months and forty years of age as well as for enlisted men in the army. The period of enlistment is for the duration of the war. The commis-

sion given to those who graduate is second lieutenant, then promotion is by selection and should be rapid for men of ability. Further particulars can be obtained by addressing the school direct.

Akron's New Terminal Nearly Completed.—The splendid new terminal building of the Northern Ohio Traction & Electric Company at Akron, Ohio, is nearing completion. Except for a few minor details, the main structure is finished and is now being occupied by the company official force. Scarcity of labor and slow delivery of materials have delayed the completion of the structure, but company officials hope to have the train shed completed by Aug. 15. The shed contains eight loading tracks and has room for twenty-four cars. The terminal adds greatly to the facilities offered by the company for handling the heavy traffic in this great industrial district. A brief description of this building, with illustrations showing the floor plans, was published in the ELECTRIC RAILWAY JOURNAL for March 9, 1918, page 465.

Forty-Cent Minimum Is Vancouver Award.—Findings of the board of conciliation in the dispute between the British Columbia Electric Railway, Vancouver, B. C., and its motormen and conductors were handed down on July 6 by Mr. Justice MacDonald. The eight-hour day principle is conceded with the recommendation that its application be postponed till after the war. A minimum wage rate for motormen and conductors of 40 cents an hour is recommended, being an increase of one-third over the present scale. The maximum wage is placed at 47 cents, an increase of 16½ per cent. Overtime, the board finds, should be paid for after nine hours' work. The period of the new agreement is fixed at one year and it is recommended that the men have a voice in preparation of the running sheets. The employees had asked for a wage scale ranging from 40 to 51 cents with an eight-hour day. The company accepted the board's findings.

Monongahela Valley Wages Adjusted.—At meetings held in both Clarksburg and Fairmont, W. Va., on July 13 employees of the Monongahela Valley Traction Company accepted a compromise wage increase offered by the company in response to their demand for higher wages. It is understood that the employees of the Parkersburg and Marietta division are in conference with company officials, and that in a few days they, too, will have reached an agreement. The power house men have come to an agreement with the company and are now awaiting the signing of their contract. The linemen and carhouse men are still in conference over their increase. The scale of wages agreed upon follow: City men in the employ less than one year 38 cents an hour; second and third year, 39 cents; fourth and fifth year, 41 cents; in service five years or longer, 43 cents. Men employed on the interurban lines will be paid 2 cents more an hour than the city men.

Financial and Corporate

Issue of Notes Approved

**Interborough Rapid Transit Company
Authorized to Offer \$39,416,000
of Notes**

The Public Service Commission for the First District of New York on July 23 gave the Interborough Rapid Transit Company permission to issue \$39,416,000 face value of 7 per cent notes dated July 1, 1918, and maturing July 21, 1921. On maturity the notes are convertible into 5 per cent bonds of the company at 87½ per cent of their face value. It is expected that this will immediately relieve the company of the embarrassment created by its failure to dispose of its bonds at the minimum price of 93½ fixed by the commission. The condition of the money market due to war conditions made it impossible for the company to find a market for the bonds at this price.

It is expected that the War Finance Corporation will take approximately 30 per cent of the notes, or about \$11,600,000 of them, and it will therefore be necessary for the company to deposit as security \$61,596,500 in 5 per cent bonds under its first and refunding mortgage of 1913, because the corporation demands collateral equal to 125 per cent of the amount of its loans. The order of the commission stipulates that the notes must be sold so as to net the Interborough company not less than 95½ per cent of their face value. Of the amount raised by the note issue not more than \$1,773,720 must be spent to meet the total expense of the sale. The remainder of the money is to be used by the company for these purposes:

For the equipment of new subways, including improvement, reconstruction or modification of existing power houses, substations or other electrical equipment	\$20,229,762
To pay the actual cost of plant and structure and equipment of third or additional tracks upon the elevated railroads...	11,771,387
To pay the actual cost of plant and structure, and for equipment of the extensions of elevated railroads	5,250,131
To pay the cost of the improvements, reconstruction or changes to the power house, substations, transmission lines, etc., for the operation of the extensions and additional tracks, including certain replacements	2,391,000

The order of the commission authorizing the sale provides that all of the notes must be amortised out of the income of the Interborough company previous to the maturity of the bonds deposited as collateral.

The action of the commission followed an opinion written by Public Service Commissioner Hubbell, who found that the requirements of the company were urgent, and that the terms proposed under the prevailing wartime conditions

were reasonable and as favorable as it was possible to procure.

These conclusions were justified, it was said, by a letter on the subject written by Charles A. Peabody, president of the Mutual Life Insurance Company, who described the proposed terms as fair and reasonable. Testimony of a similar character was given by Charles H. Sabin, president of the Guaranty Trust Company; Clarence H. Kelsey, president of the Title Guaranty & Trust Company; James Speyer of Speyer & Company; Jacob H. Schiff of Kuhn, Loeb & Company, and Frederick H. Shipman, treasurer of the New York Life Insurance Company.

A statement by the commission says that \$953,235 of the \$1,773,720 set aside to pay the expenses of the sale is allotted under the subway bond issue, and \$820,485 is allotted under the elevated railway part of the bond issue.

Many Minnetonka Bonds Extended

William A. Read & Company, New York, N. Y., announce that a very large proportion of the \$5,000,000 of Minneapolis, Lyndale & Minnetonka Railway, first mortgage 5 per cent bonds due on Jan. 15, 1919, has been extended by the present holders, who had until July 15 to accept the privilege of extension at a 7 per cent rate from July 15, 1918, to Jan. 15, 1922. The remainder of the 7 per cent bonds not extended by holders of the maturing 5 per cent bonds, have been sold by the bankers. The road is included in the system of the Twin City Rapid Transit Company.

The terms of the extension of the bonds were reviewed in the issue of the *ELECTRIC RAILWAY JOURNAL* for June 29, page 1251.

Crosstown Line Sold July 25

The New York Railways on July 25 bid in the Central Crosstown Railroad and the lease of the old Christopher & Tenth Street Railroad at auction under foreclosure proceedings brought by the Guaranty Trust Company, as trustee, acting for bondholders. The New York Railways has been operating the crosstown line since the reorganization of the old Metropolitan Street Railway.

The Public Service Commission for the First District of New York recently approved the application of the New York Railways for authority to purchase and acquire the Central Crosstown Railroad.

The commission stipulates that its approval does not prejudice its right to inquire at any future time into the value of the property to be so acquired, in any proceedings involving the rate to be charged or securities to be issued.

\$29,553,380 Maturities

Total for Last Five Months of 1918 Includes \$18,259,880 for Railway and Miscellaneous Issues

As most of the public utility issues falling due the balance of this year are for relatively small amounts, the War Finance Corporation will be called upon for little aid by public utility companies for refunding purposes compared with the large and numerous applications it received from this class of corporations in the first two months of its existence.

According to the *Wall Street Journal*, the total amount of public utility securities maturing for the last five months of the year is only \$29,553,380, as against \$81,015,000 maturing in July, and \$210,500,000 for the entire year. The bulk of the maturities consists of short-term notes, which have run from one to five years.

The maturities of issues of more than \$200,000 for the electric railways, arranged by months, as contained in the list follow:

AUGUST			
Issues:	Rate	ser.	Amount
West End St. Ry. debentures	5		\$1,581,000
Hudson Cos. secured notes	6		1,500,000
Columbus Ry. P & Lt 1-year notes	6		1,000,000
Missouri Elec. R. R. money	5		700,000
Newport & Fall River St. Ry.	5		240,000
Carolina Pwr. & Light notes	5		202,500
People's St. Ry. of Luzerne Co.	6		200,000
Miscellaneous			722,400
Railway total			\$6,145,900
Total all classes			\$12,045,900
SEPTEMBER			
Appalachian Power Co.	7		\$2,170,700
Chicago & West Towns Ry. 1st.	6		690,000
Ohio Traction Co. notes	6		300,000
Miscellaneous			775,500
Railway total			\$3,936,200
Total all classes			\$4,236,200
OCTOBER			
Cleve., P. & E. R. R. 1st. con.	5		\$1,131,000
Cleve., P. & E. R. R. 1st. ext.	5		500,000
Phil. & West Chester Traction 1st.	6		400,000
Quincy Horse Ry. & Car Co. 1st.	5		400,000
Christopher & 10th St. R. R. 1st.	4		210,000
Miscellaneous			1,303,500
Railway total			\$3,944,500
Total all classes			\$7,805,000
NOVEMBER			
Springfield Ry. & Lt. 2-yr. notes	5		250,000
Miscellaneous			382,750
Railway total			\$632,750
Total all classes			\$2,365,750
DECEMBER			
Toronto Ry. 1-yr. notes	6		\$750,000
Eastern Texas Electric Notes	6		500,000
Toronto Ry. gold notes	6		500,000
Wyandotte & Detroit River Ry.	5		425,000
Bay State St. Ry. notes	6		357,000
Pan Handle Traction notes	6		309,530
Easton, P. & Bethlehem St. Ry.	5		200,000
Miscellaneous			559,000
Railway total			\$3,600,530
Railway and miscellaneous total five months			\$18,259,880
Total all classes five months			\$29,553,380

The railway and miscellaneous securities maturing during the remaining five months of 1918 thus total \$18,259,880.

Not "Depreciation"—but "Retirement"

Electric Railway Representatives at Hearing on New York Second District Classification of Accounts Suggest Change of Terms

A second conference on the proposed new uniform system of accounts for electric railways under the supervision of the Public Service Commission for the Second District of New York was recently held at the office of the commission in Albany. The discussion turned principally on the use of the term "depreciation" and on certain portions of the instructions pertaining to depreciation accounting.

In general, however, no objections were made to the adoption of the classification as a whole, except for a letter from W. H. Williams, vice-president United Traction Company, in which the point was made that the new classification would force companies without accumulated adequate reserves to charge against operating expenses losses incident to retirements instead of charging such losses to surplus as heretofore. The result of this requirement, the letter stated, would be a financial statement that would appear superficially less favorable to such companies and would injuriously affect their credit. Mr. Williams suggested that the adoption of the new classification be postponed at least until after the war.

PROPOSED DEPRECIATION REQUIREMENTS

H. C. Hasbrouck, chief of the division of statistics and accounts, described the changes in the wording of the tentative classification made as a result of the discussion at the earlier conference in May. He stated that in view of the decision of the Court of Appeals in the New York Railways case, the language of the instructions with reference to accounting for depreciation had been modified so as to do away with the mandate that charges must be made to depreciation accounts, but that special accounts would be retained in operating expenses to which such amounts should be charged as might be determined to be proper for the purpose of taking care of the losses due to wear and tear, obsolescence and inadequacy. The recommendation was retained that under normal operating conditions the annual charge to these accounts should be between 2 and 5 per cent of the cost of way and structures and between 2 and 10 per cent of the cost of equipment.

The commission's proposed attitude on depreciation is set forth in detail as follows:

Depreciation accounts in which to include charges to cover depreciation of way and structures, equipment, power plant buildings and power plant equipment are provided in order that carriers may, through the creation of adequate reserves, equalize from year to year, as nearly as is practicable, the losses incident to important retirements of buildings, bridges, trestles, etc., or of large sections of continuous structures like track or electric line, or of definite units of equipment. "Losses" as used above means in each case the difference between the original cost to the accounting corporation of the property retired and its salvage value at the time of its retirement.

There may be an occasional exception to the literal meaning here given. For example, a corporation prior to the establishing of required uniform accounting may have pursued the policy of recognizing depreciation by writing down its assets instead of setting up a reserve. In this case the "loss incident to the retirement" would be the so far unrecognized loss—that is, the difference between the ledger value and the salvage value of the property retired.

The cost of replacing minor parts which is not recorded by any entries in the road and equipment accounts and which is commonly called the cost of "repairs" or "maintenance" as distinguished from the cost of "replacements" of large units need not be provided for through depreciation charges.

The amounts charged to depreciation accounts should be upon a basis determined to be equitable according to the carriers' experience and best sources of information and should, in all cases, be sufficient to provide, during a period of years, a reserve against which can be written off all losses sustained upon the retirement of property either when its natural life has expired or when it has become obsolete or otherwise inadequate for efficient service.

A statement of the rule used by the carrier for computing these charges shall be included in its annual report to the commission. If the carrier so desires, it may file with the commission a verified copy of its rule for determining depreciation accruals, and refer to such rule in its annual report in place of repeating it in full each year.

While each corporation may determine for itself the amount to be reserved annually for depreciation as above defined, the commission will necessarily, in deciding rate and other cases, have to pass upon the adequacy or inadequacy of such charges. As an indication of its policy in this respect, therefore, the suggestion is made, based upon the commission's experience in the regulation of electric railways, that a depreciation charge amounting to not less than 2 per cent or more than 5 per cent per annum on the average total cost of all ways and structures, or to not less than 2 per cent or more than 10 per cent per annum on the average total cost of all equipment, will, under normal operating conditions, be generally less open to question than rates which fall above or below these limits. It is also suggested that depreciation rates should preferably be stated in terms of a percentage of the cost of depreciable property, because it is believed that that form of statement is, on the whole, the clearest and simplest way of expressing the normal depreciation charge and furnishes the readiest basis for comparison between companies.

Mr. Hasbrouck explained as follows the reasons for keeping the word "depreciation" in the title of the accounts provided for the purposes above described: first, the desirability of conforming as nearly as possible to the Interstate Commerce Commission's classification of accounts for electric railways; second, the lack of a better alternative term; and third, the fact that the word "depreciation" had come to be so extensively used that an attempt to discard it entirely would only give rise to more difficulties and misunderstandings than it would eliminate. He also mentioned a rephrasing of the general instructions pertaining to depreciation accounting to make it clear there is no implication that a separate depreciation reserve must be maintained for each individual unit of property.

"RETIREMENT" SHOULD BE THE TERM

J. C. Collins, as chairman of the accounting committee of the New York Electric Railway Association, read a

memorandum embodying the views of that body. The memorandum set forth that the inclusion of charges for so-called "depreciation" in the operating expenses of an electric railway is unnecessary provided the plant and the equipment are properly maintained. If it should become necessary to make such charges, however, they should be based on the judgment of an engineer or operating manager, with respect to a definite program of replacements in a particular case, and not on any general accounting or statistical theory of standard depreciation rates. The operating expense account to which such charges are made should be called a "retirement" account rather than a "depreciation" account, and the reserve created through such charges should be called a "retirement" and not a "depreciation" reserve.

ELECTRIC ASSOCIATION FAVORS CHANGE

H. M. Brundage, for the committee of the Empire State Gas & Electric Association, also suggested the use of "retirement expense" and "retirement reserve" as substitute titles, without otherwise changing the language of the instructions relating to these accounts. He objected to basing the amount of the annual charge on any estimate of theoretical life in service for different classes of plant and equipment.

The new classification, when finally adopted, will be effective on Jan. 1, 1919. It will be printed as soon as possible and will then be formally served on all electric railways in the Second District.

Indiana Line Defaults Interest

George C. Van Tuyl, Jr., president of the Metropolitan Trust Company, New York, N. Y.; L. H. Getchofer, president of the Pittsburgh (Pa.) Trust Company; David Taylor, vice-president of the Coal & Iron National Bank, New York, N. Y.; William H. Pritchard, president of the North Adams (Mass.) National Bank, and Frank Coenen, New York, at the request of a number of holders of the first mortgage 5 per cent thirty-year gold bonds of the Chicago, South Bend & Northern Indiana Railway, South Bend, Ind., upon notification by the company that it would default in the payment of the coupons due on July 1, 1918, and that a plan of reorganization of the company was under consideration, have consented to act as a committee for the protection of the interests of the first mortgage 5 per cent thirty-year gold bonds. Holders of such bonds are asked to deposit their bonds, with coupons attached, including the coupon due on July 1, 1918, with the Metropolitan Trust Company, New York, the depository of the committee, under a deposit agreement to be dated July 17, which is being prepared.

The Chicago, South Bend & Northern Indiana Railway operates 123 miles of electric railway, connecting South Bend with Mishawaka, Elkhart, Goshen, La Porte and Michigan City.

Electric Railway Statistics

Operating Ratio Continues to Rise, According to April Returns—Slight Improvement in the West

A comparison of electric railway statistics for the month of April, 1918, with figures for the corresponding month of 1917, made by the Information Bureau of the American Electric Railway Association, indicates a slowing up of the downward tendency of net earnings and operating income. This is particularly noticeable in the Western District, which actually shows a slight improvement over last year.

OPERATING EXPENSES STILL CLIMBING

Operating expenses continue to rise at an increasing rate in all districts, but revenues have also taken a spurt this month, and although they are not keeping pace with the expenses, the increase is marked enough to retard the downward trend of the net earnings and operating income, which has been the consistent feature of recent operating statements.

Data for April, representing 6706 miles of line of companies scattered throughout the country, figured on the per mile of line basis, indicate an increase in operating revenues of 6.56 per cent, in operating expenses of 12.03 per cent, and a decrease in net earnings of 3.44 per cent. Data representing approximately 70 per cent of the above mileage indicate an increase in the amount of taxes paid of 8 per cent and a decrease in operating income of 5.72 per cent.

USUAL GEOGRAPHIC GROUPING FOLLOWED

The returns from the city and inter-urban electric railway companies, as shown in detail in the appended table, have been classified according to the following geographic grouping: Eastern District—East of the Mississippi River and north of the Ohio River. Southern District—South of the Ohio River and east of the Mississippi

River. Western District—West of the Mississippi River.

Of the three groups shown in the accompanying table, returns for the Eastern, representing 4290 miles of line, indicate an increase in operating revenues of 5.54 per cent, in operating expenses of 12.38 per cent and a decrease in net earnings of 7.48 per cent. Taxes paid by companies representing approximately 67 per cent of the above mileage increased 7.14 per cent, while the operating income of these companies decreased 12.09 per cent.

Returns from the Southern and Western Districts indicate that both have been affected by the rising cost of operation and increased taxes, the Western district in particular showing the greatest increase in taxes. But this district also had the greatest increase in operating revenues with the result that it was able to improve its condition only slightly with an increase of 1.50 per cent in operating income.

OPERATING RATIO 67.97 PER CENT

The operating ratio for the country as a whole has increased from 64.66 in 1917 to 67.97 in 1918. The operating ratio of the Eastern district has increased from 65.55 in 1917 to 69.80 in 1918. The operating ratios of the Southern and Western districts have also risen, the Western showing the smallest increase, from 65.05 in 1917 to 66.47 in 1918. In the Southern district, however, the operating ratio, while increasing faster than the Western, is still the most favorable, rising from 57.54 in 1917 to 60.60 in 1918.

Decision in Favor of City

Judge Chatfield of the United States District Court, Brooklyn, N. Y., has dismissed the complaint in an action brought by Receiver A. C. Hume on behalf of the South Shore Traction Company, New York, against the City of New York to recover \$1,750,000 damages.

Statement of Capitalization

President Shonts, of the New York Railways, Does Not Hesitate to Grasp the Thistle Firmly

It will be recalled that in the spring of 1917 the New York Railways petitioned the Public Service Commission for the right to make a charge for transfers. After the Court of Appeals of New York State decided that public service commissions had no power to increase rates of fare stipulated in franchises, the Public Service Commission for the First District concluded it had no power to grant a charge for transfers until the permission of the Board of Estimate of New York City had first been obtained. Meantime, the increase of expenses, beyond the figures existing when the petition was made, had become so pressing that it was necessary for the company to have greater income than a charge for transfers would procure; hence, the company has now a petition before the Board of Estimate for an increase of the basic fare.

The New York *Herald* recently published an editorial paragraph in which it was charged that the difficulties of the company were due to previous financial sins and over-issues of watered stock. Mr. Shonts, president of the company, immediately sent to the editor of the *Herald* a letter upon this subject. The company is also pressing the point home in other publicity matter.

REVIEW OF FINANCES

Mr. Shonts, in his communications to the *Herald* and to civic bodies, seized the thistle firmly, stating the position of the company to the following effect:

The New York Railways was organized on Dec. 29, 1911. Hence it has always been under Public Service Commission regulation. The company's stock represents actual value and there is no water in its capitalization. The company arose from the ruins of the Metropolitan Street Railway and the New York City Railway, which had been in the hands of receivers. A joint com-

COMPARISON OF REVENUES AND EXPENSES OF ELECTRIC RAILWAYS APRIL, 1918 AND 1917

Account	United States				Eastern District				Southern District				Western District			
	Per Mile of Line				Per Mile of Line				Per Mile of Line				Per Mile of Line			
	Amount, April, 1918	1918	1917	% Increase Over 1917	Amount, April, 1918	1918	1917	% Increase Over 1917	Amount, April, 1918	1918	1917	% Increase Over 1917	Amount, April, 1918	1918	1917	% Increase Over 1917
Operating revenues.....	\$13,508,276	\$2,014	\$1,890	6.56	\$8,253,736	\$1,924	\$1,823	5.54	\$1,258,908	\$1,533	\$1,446	6.02	\$3,995,632	\$2,505	\$2,283	9.72
Operating expenses.....	9,178,697	1,369	1,222	12.03	5,761,096	1,343	1,195	12.38	762,679	929	832	11.66	2,654,922	1,665	1,485	12.12
Net earnings.....	4,329,579	645	668	3.44	2,492,640	581	628	7.48	496,229	604	614	1.63	1,340,710	840	798	5.26
Operating ratio, per cent.	1918, 67.97; 1917, 64.66				1918, 69.80; 1917, 65.55				1918, 60.60; 1917, 57.54				1918, 66.47; 1917, 65.05			
Av. No. miles represented	1918, 6,706; 1917, 6,625				1918, 4,290; 1917, 4,274				1918, 821; 1917, 765				1918, 1,595; 1917, 1,586			

COMPANIES REPORTING TAXES

Operating revenues.....	\$9,091,397	\$1,950	\$1,837	6.15	\$4,884,505	\$1,685	\$1,614	4.40	\$589,831	\$1,735	\$1,627	6.64	\$3,617,061	\$2,540	\$2,342	8.45
Operating expenses.....	6,287,383	1,370	1,240	10.48	3,610,051	1,245	1,138	9.40	355,234	1,045	905	15.47	2,422,098	1,701	1,528	11.32
Net earnings.....	2,704,014	580	597	2.85	1,274,454	440	476	7.56	234,597	690	722	4.43	1,194,963	839	814	3.07
Taxes.....	627,993	135	125	8.00	347,984	120	112	7.14	49,463	145	138	5.07	230,546	162	147	10.20
Operating income.....	2,076,021	445	472	5.72	926,470	320	364	12.09	185,134	545	584	6.68	964,417	677	667	1.50
Operating ratio, per cent.	1918, 70.26; 1917, 67.50				1918, 73.89; 1917, 70.51				1918, 60.23; 1917, 55.62				1918, 66.97; 1917, 65.24			
Av. No. miles represented	1918, 4,663; 1917, 4,634				1918, 2,899; 1917, 2,885				1918, 340; 1917, 334				1918, 1,424; 1917, 1,415			

† Decrease.

mlttee, representing interests in both companies, made a plan for reorganization and the establishment of this company.

That reorganization plan reduced the capital \$41,883,894.50, and the Public Service Commission, specifically basing its action upon a decision by the Court of Appeals, approved the capitalization as then fixed.

The capitalization of the company is less than the value of its property. The sum total of stock, bonds and convertible scrip, underlying bonds or other mortgage indebtedness, is \$76,018,087.19. (This not only excludes any value for any of the franchises, although these alone are taxed by the State on the value of \$13,000,000, but it also excludes any "going value.")

At normal average prices, the value of the company's property used in the public service (exclusive of franchise and goodwill value) is, at a low estimate, \$92,000,000.

At the time of the reorganization, the Public Service Commission fixed a valuation of the company's property, for the issuance of securities, at \$85,801,000. This did not include franchise or "going value," either of which would have brought this value up to more than \$100,000,000. And more than \$3,199,000 has since been expended in additions and betterments.

Some of the company's opponents, while admitting that the company has paid no dividends, have declared that the situation of the New York Railways is due to excessive rentals, which it pays for leased and controlled lines. In reference to this, Mr. Shonts speaks to the following effect:

As to dividends and rentals: the shareholders of the New York Railways have never received any dividends on the company's stock.

The company is paying certain rentals—in the form of dividends or interest—to the owners of securities of some of the companies in the system, and some of these securities are owned by the company. This matter has been the subject of much misunderstanding, but the following facts are to be noted:

1. The securities do represent real value, a value which justifies the rentals. The value of these securities has been authenticated by the public authority which fixes the company's taxes. Taking their valuation (which includes both real estate and franchises) as a basis, the total return actually paid to security holders of leased and controlled lines is less than 6½ per cent on the valuation. This includes payments on securities owned by the company.

2. The total of these securities is less than a quarter of the total capitalization.

3. The total rentals now paid (\$1,620,713) constitute a return of only 7.49 per cent on the par value of the outstanding securities (\$21,612,144), the only part of the system that has ever had anything like a fair return.

Much emphasis is laid on the fact that every line leased was necessary to a complete system that, with transfers, could give the best and cheapest service.

Without discussing whether the terms of any or all of the leases are too high or too low, the important consideration, as it affects the public, is stated to be: The rentals have no effect on the fare. High or low, they must

come out of the statutory "fair return" on the value of the property in the system as a whole.

Having made these points, the company then develops the importance of the transfer system and points out that a receivership would put the continued existence of the transfer system in peril and that the loss of transfers would cost the public in dollars and cents more than the additional fare.

The company, in short, not only appeals to the fairness of the public, but it shows that the public does have a dollars and cents interest itself in the company's appeal for increased fare.

Financial News Notes

Holyoke Dividend Put Over.—The Holyoke (Mass.) Street Railway has omitted its usual dividend payable at this time, due, it is said, to increased expenses. It is understood that the stockholders have in mind a service-at-cost plan as provided at the last session of the Massachusetts Legislature. In January of this year a dividend of 1½ per cent was declared and in July, 1917, a like amount.

Babylon Railroad Suspends.—The Babylon Railroad, operating between Amityville and Babylon, Long Island, N. Y., and from the main street of Babylon down to Great South Bay, has suspended service, its power having been shut off by the Long Island Lighting Company. The management of the lighting company says that the railroad owes the company about \$7,000.

Changes in Personnel of Ohio Road.—The officers of the Cincinnati & Dayton Traction Company, the successor to the Cincinnati, Dayton & Toledo Traction Company, the property of which was recently sold under foreclosure to the representatives of the bondholders, are as follows: J. M. Hutton, president; Otto Armleder, first vice-president; Claude Ashbrook, secretary; Leo Van Lahr, treasurer; The Warren Bicknell Company, operat-

ing managers; M. Ackerman, resident manager and purchasing agent; C. A. Hamilton, superintendent; J. M. Brick, general freight and passenger agent; J. P. Davis, chief engineer power station, and M. Schoenhals, master mechanic.

Decrease in Passengers in St. Louis.—The quarterly report of the United Railways, St. Louis, Mo., filed on July 15 with City Register Cuendet, shows that in the three months ended June 30, which included one month of 6-cent fares, the company carried 1,000,000 fewer passengers than in the corresponding three months last year, but received \$148,622 more revenue because of the 6-cent fare. In the last three months the cars transported 19,626,961 passengers at a 6-cent fare, 41,640,680 at a 5-cent fare and 977,407 children at half-fare. The cars made a total of 1,533,880 trips and traveled 10,064,977 miles. The average number of cars on week days was 1293, and on Saturdays 1171. An average of 772 cars were run on Sundays. In the same three months last year, the cars hauled 62,155,641 passengers for a 5-cent fare and 1,107,288 children for half fare. An average of 1278 cars were operated on week days, 1184 on Saturdays and 808 on Sundays, the report shows.

Commission Opposes Delay.—At the direction of the Public Service Commission for the First District of New York a letter has been sent to Pierre Jay, chairman of the district committee on capital issues in reference to the application of the New York & Queens County Railway, Long Island City, for approval by this financial committee of an issue of bonds amounting to \$281,000 for construction work ordered by the commission in Flushing Avenue, Borough of Queens. The commission's letter states that while the company's application, in form, asks approval of the bond issue, in actuality the petition is a request to the committee to refuse its approval and to disapprove and bar for the period of the war, the construction work in question. The commission asks the committee not to give the railroad the benefit of an adverse decision upon its application on the ground that the construction work has been ordered by the commission and is a necessary and important public improvement.

Electric Railway Monthly Earnings

ATLANTIC SHORE RAILWAY, SANFORD, ME.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., June, '18	\$14,865	\$12,151	\$2,714	\$517	\$2,197
1m., June, '17	16,495	11,654	4,861	450	4,431

AURORA, ELGIN & CHICAGO RAILROAD, WHEATON, ILL.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., May, '18	\$176,189	\$141,073	\$35,116	\$35,975	\$1859
1m., May, '17	178,494	*134,555	43,939	35,706	8,233
5m., May, '18	772,536	*690,117	82,419	179,267	196,848
5m., May, '17	811,752	*604,076	207,681	178,795	28,886

CITIES SERVICE COMPANY, NEW YORK, N. Y.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., June, '18	\$1,808,929	\$38,393	\$1,770,536	\$5,730	\$1,764,785
1m., June, '17	1,988,560	79,785	1,908,775	233	1,908,542
12m., June, '18	20,907,945	398,630	20,509,315	13,811	20,495,500
12m., June, '17	15,863,984	300,303	15,563,681	13,999	15,551,682

* Includes taxes † Deficit ‡ Includes non-operating income.

CLEVELAND, PAINESVILLE & EASTERN RAILROAD, WILLOUGHBY, OHIO

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., May, '18	\$46,226	*\$30,633	\$15,593	\$11,512	\$4,081
1m., May, '17	43,746	*29,011	14,735	12,176	2,559
5m., May, '18	206,022	*140,888	65,134	57,144	7,990
5m., May, '17	195,889	*120,928	74,961	58,953	16,008

LAKE SHORE ELECTRIC RAILWAY, CLEVELAND, OHIO

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., May, '18	\$161,528	*\$118,466	\$43,062	\$36,001	\$7,060
1m., May, '17	141,530	*97,997	43,533	34,253	9,280
5m., May, '18	772,168	*585,297	186,871	181,005	5,866
5m., May, '17	659,925	*465,053	194,872	171,837	23,035

REPUBLIC RAILWAY & LIGHT COMPANY, YOUNGSTOWN, OHIO

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., June, '18	\$449,349	*\$313,081	\$136,268	\$100,833	\$35,435
1m., June, '17	375,345	*254,386	120,959	80,514	40,445
12m., June, '18	5,467,509	*3,832,521	1,635,008	1,111,278	523,730
12m., June, '17	4,283,069	*2,688,203	1,594,866	907,876	686,990

Traffic and Transportation

New Fare in Effect

Kansas City, Mo., Goes to a Six-Cent Fare Without Any Undue Complications

The Kansas City (Mo.) Railways on July 15 put into effect the 6-cent fare authorized and ordered by the Public Service Commission of Missouri. Each conductor was supplied with several dollars in pennies, but there was little need for making penny change. Many of the passengers had pennies ready, but in some cases the penny was proffered with dimes, quarters and half dollars, the change to be made being the same as in case of a 5-cent fare.

175,000 METAL TICKETS SOLD

The company had issued about 50,000 metal tickets several weeks ago for which 5 cents each had been paid. Fully 40,000 of these, it has been estimated, had been retained by purchasers, and are now being used to pay 6-cent fares. The company issued 125,000 metal checks of a new lot, many going out a day or so before the higher fare went into effect, for which purchasers paid 6 cents. These were mostly bought by county and city officials and deputies, in large lots, and for similar purposes by institutions which provide car fare to representatives. The company is expecting 125,000 more of the metal checks, delay having occurred at the factory.

A few passengers proffered \$2 bills—a Missouri law existing under which a conductor must pass up a passenger whose \$2 bill he cannot change, the law giving the privilege of ejecting the passenger who proffers a \$5 or larger bill that cannot be changed.

The 6-cent fare applies only in Missouri. Passengers boarding cars in Kansas City, Rosedale and other parts of the company's lines in Kansas, pay only 5 cents. The cars entering Missouri are stopped at the State line, where collectors from the inspection department of the company go through the cars and take up an additional cent for the ride into Missouri. On the morning the new fare went into effect collections were made in an average time of a minute and a half, most of the passengers having their pennies ready. Eighty-six per cent of the business of the company is in Missouri, so that the temporary necessity of operating at a 5-cent fare in Kansas does not impose a serious loss on the company.

SLIGHT DECREASE IN TRAFFIC

There was occasional controversy with passengers asked to pay the extra cent, due chiefly to local agitation against the increased fare.

Attorneys for the city and the city

commissioners in Kansas City, Kan., are seeking methods of preventing the collection of the penny from interstate passengers. The appeal of the Public Utilities Commission to the Supreme Court, in the case of the injunction issued by the County Court against the holding of a hearing by the commission on the company's application for increased fare in Kansas, is still pending.

SLIGHT DECREASE IN TRAFFIC

The revenue of the railway on the first day of the increased fare, ran about 17 per cent ahead of the usual Monday revenue. Average traffic on that day, with the additional 1 cent from all passengers, would of course have increased the revenues a full 20 per cent.

Attacks Michigan Two-Cent Law

The Grand Rapids, Grand Haven & Muskegon Railway, Grand Rapids, Mich., has filed suit in the United States District Court in Grand Rapids to "test the validity and enjoin the enforcement of the statute of the State of Michigan fixing the maximum fare for railroads at 2 cents a mile."

The company alleges that it is operating at a loss, and that to continue to force the railway to conform to the 2-cent fare is practically the confiscation of its property for public use, without just compensation and due process of law, and in violation of the constitution of the United States and the constitution of the State of Michigan.

District Judge Sessions set July 23, for the defendants to show cause why a temporary injunction should not be issued in favor of the company.

The company in its bill prays:

"That Act No. 54 of the public acts of the Legislature of the State of Michigan of the year 1907, approved April 18, 1907, and effective Sept. 29, 1907, as amended by the Public Acts No. 276 of the year 1911, be adjudged and decreed null and void and of no force and effect so far as the complainant railway, its officers, agents or representatives are concerned, as in violation of the constitution of the United States and the constitution of the State of Michigan.

"That a temporary injunction be issued pending the trial and final decree in this section, according to the course and practice and out of and under the seal of this honorable court, strictly enjoining and restraining the defendant, Alexander J. Grosbeck, as Attorney General for the State of Michigan, from enforcing or attempting to enforce in any manner whatsoever, Act. No. 54 of the public acts of the Legislature of the State of Michigan, etc.

"That a temporary writ of injunction be issued pending the trial and final decree in this action."

Rights of Cities Denied

Pennsylvania Commission Holds Power Over Rates Belongs to People, Not to Municipalities

The Public Service Commission of Pennsylvania ruled on July 21 that it is within the power of the commission to increase or lower electric railway rates as the evidence justifies, notwithstanding that a specific rate was fixed by municipal ordinances.

The decision was rendered in the case of the borough of Wilkinsburg vs. the Pittsburgh Railways, wherein it was argued by the borough that the corporation could not increase its fares because it had accepted the terms of a franchise ordinance limiting the fare to 5 cents. The commission says:

"The ability of the company (Pittsburgh Railways) to make extensions and improvements is so dependent upon the return it is entitled to receive that the regulation of each must be placed in one body; and the Legislature has designated the Public Service Commission as this body. The power of the commission to regulate rates will also result in eliminating discriminations bound to exist where rates are fixed by a number of municipalities, all served by one street railway system."

The opinion recognizes the validity of the conditions contained in the municipal consents, but holds that these contracts were entered into, or conditions were accepted, subject to the continuing right of the people, through the Legislature, to exercise police power, even if such exercises result in wiping out the terms agreed upon.

WHERE REGULATION IS LODGED

The report of the commission says:

"It was conceded at the argument and is settled by judicial authority that municipalities have not been invested either by the constitution or by the Legislature with rate-regulating authority. If the regulation of rates and service of utilities is a proper exercise of the police power of the commonwealth and cannot be abridged, and if the municipality has no power to regulate rates of street railways, it would follow, if the complainants' position is sustained, that that power, in this respect, at least, cannot be exercised by any body or authority within such municipalities, and therefore the constitutional mandate, generally conceded to be one of highest importance to the inarticulate citizenry, is nullified or suspended. If such a position is to be sustained, it ought to be sustained upon very clear authority and supported by cogent and impelling reasons."

Commissioner Ryan dissented.

The opinion by the Public Service Commission does not grant the rate increases. It merely says the commission has the right to grant increases or compel decreases. The next step in the case of the borough of Wilkinsburg and the dozens of other municipalities protesting rate increases will be the calling of hearings, in which the railways will present their claims for an increase.

Seven-Cent Fare for Boston on Aug. 1

Recently Appointed State Trustees See in This Move Only Means of Preventing Financial Disaster

A 7-cent fare will be established on the entire system of the Boston (Mass.) Elevated Railway beginning on Aug. 1, according to a statement of the trustees of the company issued on July 24. The new fare will be in force until further notice and the existing 5-cent fare will be abolished, as will the use of 8-cent checks on certain lines.

FIVE TICKETS FOR THIRTY-FIVE CENTS

Beginning on July 29, tickets will be sold in strips of five for 35 cents at all prepayment stations and by collectors, ticket sellers and conductors. Tickets will also be sold at many important stores and industrial concerns, and the public is urged to supply themselves with tickets previous to Aug. 1.

It is hoped to speed up the service materially by the use of tickets. Cash will not be accepted at prepayment stations, except at ticket windows. While cash will be accepted by conductors, it is to be the policy of the company to encourage the use of tickets to the maximum. The same ticket will be accepted at all stations and on all cars, and the tickets will be transferable. Transfers will be issued along present lines, without extra charge, for travel in the same general direction, and the existing system of free bodily transfers will be continued.

After Aug. 1 the 5-cent tickets now in the possession of passengers will not be honored by the company, but the treasurer will refund their value upon presentation.

STATEMENT BY TRUSTEES

The statement issued by the trustees on July 25 follows:

"Commencing on Aug. 1, at 4 a. m., and continuing until further notice, the rate of fare in all cases on the lines of the Boston Elevated Railway where the unit is now 5 cents will be 7 cents. The use of 8-cent checks will be discontinued.

"This increase in fare is made by the trustees in performance of the duty expressly imposed upon them by law (Chap. 159 of Special Acts of 1918) to 'fix and put in operation rates of fare which in their judgment will produce sufficient income to meet the cost of service' including operating expenses, interest, taxes, rentals, depreciation and the dividends specified by the statute.

"After making a careful study of the finances of the company and taking into consideration the known increase in various elements of its expense in the near future, according to the most conservative estimate it will be necessary to procure during the year ending July 1, 1919, additional revenue of about \$6,150,000. It seems reasonable to believe that this amount will be produced by the 2-cent increase in the fare rate. If, however, this result is not brought about, other expedients will have to be 'red.

"The difficulties of operating surface, subway and elevated lines preclude the introduction of a zone system or an elaborate change in the transfer privileges at this time.

250 CARS ORDERED

"For the purpose of making much needed improvements in service 250 new cars and other equipment have recently been ordered by the trustees. War conditions familiar to all will make it impossible to secure a speedy delivery of this new equipment, and such conditions also handicap the road in procuring and keeping competent employees and in obtaining coal and other necessary supplies. Nevertheless, the trustees will bend every energy to give the public the best service that can be supplied under the circumstances.

"It is possible that further consideration and study by the trustees will result in modifications of the fare which is established at this time, but to-day, confronted as the trustees are by the serious emergency arising from the tremendous monthly deficit in the company's revenue, and the necessity under the law of protecting the Commonwealth from paying the company's bills, the trustees have no alternative but to increase the unit of fare.

PUBLIC CO-OPERATION ASKED

"The trustees ask that the public be patient in the unavoidable difficulties that now confront the road, and that may under the pressure of war conditions become still more burdensome, and give the trustees sincere co-operation in their effort to conduct the business of the company with the highest degree of efficiency obtainable under existing conditions."

Advertises Car Service

Lynn Merchant Explains Why Publicity Is Needed to Secure Traffic During Off-Peak Hours

The Lynn papers recently carried large display advertisements of the tickets which are good between 9 a. m. and 4.30 p. m. and are sold at six for 25 cents by the Bay State Street Railway. The advertisements were inserted by Ralph S. Bauer, large dealer in furniture in Lynn, who during the recent hearings before the commission had advocated this reduced off-peak rate. Mr. Bauer explains his reason for the publication of these advertisements in a letter to Wallace B. Donham, receiver of the company. After saying that he had made a canvass of 120 Lynn people who are frequent riders on the road to find that only twelve knew of the reduced rate, he continued:

"The only commodity the Bay State Street Railway has to sell is car rides. The investigation I personally made last week, as to the number of people

who knew about the tickets to be used during the non-peak-load hours was such a revelation to me that I am sure, as a merchant who has bought newspaper publicity for more than twenty years, and previous to that time who sold newspaper publicity for fifteen years, there is a tremendous need of newspaper publicity to educate the people as to the different kinds of fares and rides under which the Bay State Street Railway now operates. I hope you will take up the matter from this point and exploit it in a way as to bring returns to your company.

SELL CAR RIDES LIKE MERCHANDISE

"I believe it is possible to get thousands of new riders in your district on this proposition if you go after them as a merchant goes after customers for a line of goods he wishes to dispose of. On the other hand, if you do not merchandise the only commodity you have to sell in what appears to be the modern, efficient way—newspaper publicity—it is very doubtful whether the full measure of success will result from any action your railway may take. An educational campaign also ties the people closer to you because they believe you are making an effort intelligently to help them understand your public service."

Baltimore Wants More

The United Railways & Electric Company, Baltimore, has filed a petition with the Public Service Commission for an increased rate of fare. The company asks the approval of the commission of "a uniform cash fare of 6 cents in lieu of all cash fares now collected except in the case of children between the ages of four and twelve years, and in the case of such children and also in case of all those riders now using commutation tickets a uniform increase of 1 cent."

T. A. Cross, president of the company, on July 20, addressed the following letter to all employees:

"In to-day's papers you will find an announcement over my signature regarding the 'United's' inability to continue its service for a 5-cent car fare.

"This announcement will be followed by a series of others pointing out exactly what the problems are that confront the company.

"It is your duty to read and become thoroughly familiar with all the facts brought out.

"You can't prosper unless the company prospers. Therefore, you should make it your business to be able to talk intelligently about the road's condition and needs whenever the opportunity presents itself.

"I will appreciate your hearty co-operation, and I am going to take it for granted that you are going to do all that you can possibly do to prove to the public that what we are asking of them is fair, reasonable and absolutely necessary.

"In anticipation of your help and co-operation, I am, with best wishes,"

Six Cents in Saginaw

The Saginaw-Bay City Railway, Saginaw, Mich., has obtained permission to charge a 6-cent fare in Saginaw, in which city it operates under a franchise granted twenty-five years ago, at rates of fare as follows: Single cash fares, 5 cents; regular tickets, six for 25 cents; labor tickets, eight for 25 cents; school tickets, eight for 25 cents.

Some time ago the company petitioned the City Council to pass an amendment to its franchise granting it authority to charge 6 cents straight for all passengers carried. The City Council considered the matter carefully and then engaged the services of Prof. M. E. Cooley of the University of Michigan to appraise the property and report to the City Council whether the company's request was justified. The report of Professor Cooley stated clearly and emphatically that the request of the company was fully justified. The City Council, therefore, on July 2 passed an amendment authorizing the increased rate of fare. The ordinance became effective on July 16.

All special rate tickets have been abolished and the fare is now 6 cents straight with five tickets for 30 cents, as a matter of convenience.

During the negotiations of the company with the City Council, the railway conducted an educational campaign in the newspapers, explaining its position. After this campaign had been closed the railway reproduced the newspaper articles in pamphlet form and distributed them by means of small "Take One" boxes placed in all the cars. The company also displayed posters on its cars.

Vancouver Jitneys Eliminated

The City Council of Vancouver, B. C., on June 21 passed a by-law prohibiting jitney operation in Vancouver and on the interurban line between Vancouver and New Westminster. This action was taken in accordance with the report of Dr. Adam Shortt made last November and with the agreement made with the city in June, 1917, to carry out Dr. Shortt's recommendations. The jitneys were to go from the streets on June 30. The by-law recites that after July 1, no person was to drive or operate any motor vehicle coming within designations set out in the measure as Class "A" or "B."

The city jitney was eliminated by Class "A" and the interurban jitney by Class "C." The latter operated on a 25-cent fare between Vancouver and New Westminster. This clause prescribes that the fare for any distance greater than 2 miles outside the city limits shall be at least 50 cents. It was agreeable to the company that the jitney line running between Vancouver and Woodward's Landing should continue to operate since it did not compete with any of the lines of this company.

The New Westminster jitney service has been in the hands of the Blue Funnel Motor line, composed of a number

of independent owners operating one or more cars under the same name. It is possible that the representatives of the jitney interests may contest the by-law in the court.

Despite the order ruling the jitneys out on July 1 the vehicles were continued in operation upon advice of their attorneys. They raised the fare to 10 cents. Steps are being taken by the jitney attorneys to quash the by-law calling for the elimination of the automobiles.

Kansas Rates in Court

Judge E. L. Fisher, of the District Court of Wyandotte County, Kansas, has issued an injunction against the Public Utilities Commission of Kansas considering the matter of rates of the Kansas City (Mo.) Railways in Kansas City, Kan. The attorney for the Public Utilities Commission has appealed to the Supreme Court. Judge Fisher's decision carries two points: one was that he had jurisdiction to consider the application of the City Commissioners of Kansas City, Kan., for the injunction against the Utilities Commission; the other that the Utilities Commission had no authority to interfere in the rates, which were entirely a matter of contract between the city and the company and therefore should be handled by the City Commissioners.

The Supreme Court had previously refused a writ of mandamus asked for by the attorney for the Utilities Commission, following the filing of the petition for the injunction and the granting of the temporary restraining order by Judge Fisher. It is understood, however, that it is possible that federal participation in the subject may obviate the necessity for final adjudication of the State Commission's authority over fares.

The War Labor Board will probably soon take up the matter of wages of the employees of the Kansas City Railways in Kansas and may then bring about an increase in fares in order that wages be raised.

Company Publication Enlarged

With the July number the *Puget Sound Electric Journal* will become the house organ for the district, covering the news of the various companies under Stone & Webster management in the Pacific Northwest. The paper is now in its eighth year as the company publication of the Seattle division. The principal features of the enlarged paper will consist of a department of intimate talks to readers from the executive offices, which will reflect the attitude of district officials toward the problems of the several communities included within the district and also a discussion of the problems of the companies themselves. The purpose is in short to give the employees of all of the companies under the management of Stone & Webster in the Pacific Northwest territory an enlarged knowledge of the affairs of the management in the district.

Hull Fare Increase Allowed

The Board of Railway Commissioners has authorized the Hull (Que.) Electric Company to increase passenger and freight rates on its line to Aylmer. Judgment by the commission was made on June 26, but announcement of the decision by the board was not made until July 9.

The company is authorized to increase its standard passenger rates from a basis of 2½ cents per mile, to a basis of 2.875 cents per mile, which figures out as a 15 per cent increase. One of the most noticeable increases in the freight business will be on coal. In the past, a charge of 50 cents per ton has been made on coal from Hull to Aylmer. On this commodity the board has allowed an increase of 15 cents.

With regard to the claims of the company, the board finds in part as follows:

"The increases in cost, and especially in wage cost, are clear and unmistakable. There is nothing before the board to warrant an assumption that there will, under existing conditions, be such an increase of traffic as to take up these increased costs and in addition give a reasonable return on the investment. Nor is there anything established by way of showing that there are any economies or efficiencies neglected, which economies or efficiencies, if utilized, might take care of existing costs."

The judgment then goes on to say that a case for an increase has been made by the railway company, not only as concerns the standard rates but also for special rates.

New Jersey Decision Accepted

The Public Service Railway, Newark, N. J., on July 23 filed with the Board of Public Utility Commissioners its acceptance of the conditions upon which the company recently was authorized to put into effect an increase of 1 cent on all transfers issued. In filing its acceptance the company through its counsel made the following statement to the commission:

"If the commission please, the Public Service Railway has filed its acceptance of the three conditions mentioned in the order of July 10 made in the fare increase matter.

"One of those conditions requires the company to submit a plan for an equitable zoning system by Jan. 1 next. The testimony of the witnesses for the company at the hearing showed that such a plan, if possible to be prepared at all, would require much longer than five months. However, the company will proceed in good faith to prepare the best plan it can as rapidly as practicable and submit it for consideration in the best form possible by the first of January."

The decision of the commission in this case was reviewed in the *ELECTRIC RAILWAY JOURNAL* for July 20, page 113.

Transportation News Notes

War Emergency Fare Agreement.—The Council of Milwaukee, Wis., has finally passed an ordinance permitting the Milwaukee Northern Electric Railway to sell six instead of eight city fare tickets for 25 cents and twenty-five for \$1. This is to give the company financial relief during the war, and by it neither the city nor the company will waive rights under the 1907 franchise.

Formal Twin City Plea Made.—Horace Lowry, president of the Twin City Rapid Transit Company, appearing before the City Council of St. Paul, Minn., on July 10 intimated the company faced bankruptcy because of increased cost of operation and pleaded for increased fares. He did not ask for any fixed rate, rather leaving the measure of relief to the company to be decided after the presentation of the evidence. The Council appointed a committee to confer with the Minneapolis Aldermen and arrange a joint session at which Mr. Lowry will present details for both cities.

Fare Increase in Laurel.—The difficulties attending the operation of the railway lines of the Laurel Light & Railway Company, Laurel, Miss., have been very satisfactorily adjusted. The employees of the railway recently demanded an increase in wages. The management of the company agreed with the men, that they were entitled to an increase if it were possible for the company to obtain higher rates. A petition was presented to the city and for a period of about two weeks the line ceased operating, pending a public election to be held for the approval of the company's fare demand. At this election, held on July 12, it was voted to grant the 6-cent fare. Railway service was immediately resumed.

Los Angeles Jitneys Recalled.—By a unanimous vote the Board of Public Utility Commissioners of New Jersey has requested the city attorney to draw a resolution to the effect that on Aug. 1 all existing licenses covering buses paralleling electric railway lines shall become void. It was explained that where public convenience and necessity require the board will grant licenses covering the operation of jitneys on other routes. The board's action will wipe out the sixteen jitney buses operating on the Main and Moneta Avenue line and the thirteen operating on the Central Avenue line. According to Assistant Engineer Anderson of the utilities department, the total revenue of these lines is about \$74,160 annually.

Youngstown-Alliance Freight Service.—Harry Rhodehouse, manager of the traffic bureau of the Chamber of

Commerce at Youngstown Ohio, announced on June 19 that a daily six-hour freight service between Youngstown and Alliance had been started over the lines of the Mahoning & Shenango Railway & Light Company and the Alliance & Mahoning Valley Railway. This, it is said, will relieve congestion on the steam roads and give shippers a service that is superior to anything they have had heretofore. Plans are also being worked out for a service connecting Cleveland, Akron, Canton and Youngstown, with intermediate points, in connection with the Northern Ohio Traction & Light Company's lines. The starting of this service will depend upon the success of the Youngstown-Alliance line.

Would Use One-Man Cars in Galesburg.—The Galesburg Railway, Light & Power Company, Galesburg, Ill., included in the system of the Illinois Traction Company, has asked the City Council for permission to use one-man cars. In its petition the company said: "As the gross receipts are not enough to pay the expenses of the company because of the high cost of fuel, material and up-keep and operating expenses and the decrease in the traffic because of thinning of population and increasing automobiles and also because the employees have asked an increase in wages, the company feels that it is justified in asking for permission to use the one-man cars, and it will so alter and equip the present cars to meet the approval of the Public Utilities Commission." The matter has been referred to the City Attorney and to the Public Utilities Commission.

Interurban Rates Modified.—A rate of 1½ cents a mile has been ordered on the Kansas City-Western Railway, the Leavenworth line, by the Public Utilities Commission of Kansas when patrons pay in advance for forty rides a month between specified points on the road. The tickets are not transferable, and cannot be used beyond the thirty-day period indicated thereon when purchased. When forty-ride books are not used, patrons pay 2 cents a mile. A charge of 10 cents is made in addition, when a patron boards a car, without a ticket, at a station where tickets are sold. The commission had previously established the fare between Kansas City and Leavenworth at 50 cents, with no reduction for round-trip tickets. Formerly, the company sold round-trip tickets for 75 cents, and also sold commutation tickets as low as 44 cents for the round trip. The zone system of fares was in effect previously. Under it in some cases the rates were around 1 cent.

New Chicago-Joliet Rates Filed.—Increased fares on city and interurban lines will become effective on or about Aug. 12, if a petition to that effect, presented to the Utilities Commission of Illinois by the Chicago & Joliet Electric Railway, Joliet, Ill., is favorably acted upon. The petition embodies a request for authority to increase the passenger fare rates on Joliet city lines

from the present charge of 5 cents to 7 cents. Also to increase the passenger rate on the line between Chicago and Joliet from the 1.87 cents per mile for one-way tickets to a straight 2 cents per mile. Round-trip fares will be changed to the sum of two single fares in the place of the present rate of 1.75 cents per mile. Individual commutation tickets will be changed from the present rate of 1 cent per mile to 1.5 cents per mile. Cash fares paid from points where passengers could have secured a ticket will be raised from 2.5 to 3 cents per mile, and special excursion rates will be changed from 1 to 1.5 cents per mile.

I. C. C. Hearing at Louisville.—Hearings were held in Louisville, Ky., on July 15 and 16 before an examiner for the Interstate Commerce Commission on the applications for increased fares made by the Louisville & Southern Indiana Traction Company, operating to Jeffersonville, and the Louisville & Northern Indiana Railway & Light Company, operating to New Albany. The Public Service Commission of Indiana has already allowed an increase from 5 cents to 10 cents for the interurban ride from New Albany to Jeffersonville, both of which cities are in Indiana. Olaf Erickson, Chicago, was examined first. It was largely on the strength of the investigation and report made by him to the owners of the properties that the application for the increases was based. At the request of Col. C. L. Jewett, representing the legal department of the city of New Albany, it was agreed that oral arguments would be made in Washington before the commission at a date convenient for the commission. Briefs may be filed as late as Aug. 16.

Albany Fare Brief Filed.—The United Traction Company, Albany, N. Y., on July 12 filed its brief with the Public Service Commission for the Second District of New York in connection with its plea to that body for a 6-cent fare. The company complains that in the "general acquiescence" of localities served by its lines, the only objection comes from the Albany zone. The company says: "Certain officers of the city and members of a commercial organization have so far misapprehended the condition as to convince themselves that if Albany could be isolated from the balance of the company's system, its railway business would be found to be profitable at the present rate of wages and fares. The facts refute the suggestion. The sole question in this case is whether the United Traction Company shall be allowed a living wage. It is pleading for its life in this proceeding, and unless relief is obtained, its continued existence as an efficient agency for public service inevitably must cease. Enforced restriction of rates to the present level would confiscate not only the equity of the stockholders, but the security of the bondholders." An extension of time for one week has been granted to the city for filing its brief.

Personal Mention

Mr. Shoup, Vice-President

Head of Pacific Electric Railway Made
Southern Pacific Vice-President
After Many Years' Service

Paul Shoup, president of the Pacific Electric Railway, Los Angeles, Cal., since 1912, was signally honored on July 11 when he was elected a director, vice-president and assistant to the president of the Southern Pacific Company. While his election makes him one of the highest officials of the Southern Pacific, Mr. Shoup will not sever his connections with the Pacific Electric Railway. He will be the executive representative of the Southern Pacific Company on the Pacific Coast with headquarters in San Francisco. He will continue to have

their excellent personnel. Prior to 1912 Mr. Shoup was vice-president of the lines. Before becoming connected with the Pacific Electric Railway he was assistant general passenger agent of the Southern Pacific Company. He entered the service of the Southern Pacific Company in 1891 as a clerk in the office at San Bernardino. When the narrow-gage railroad between Riverside and San Bernardino went into the hands of a receiver Mr. Shoup was practically in charge, and he is said to have been largely responsible for converting the road into a paying investment. Mr. Shoup next entered the passenger department of the Southern Pacific Company. Soon thereafter he went to San Jose as district freight and passenger agent of the company. He went to Portland, Ore., later and reorganized the freight department of the Southern Pacific Company in that city. From December, 1908, until April, 1910, Mr. Shoup gave his time to the interests of the late E. H. Harriman in California not related to the Southern Pacific Company. Prior to his election as vice-president of the Pacific Electric Railway Mr. Shoup was assistant general manager of the Southern Pacific Company, in charge of its electric lines in California, which included the Los Angeles-Pacific Company and Peninsula Railway, San Jose.



PAUL SHOUP

general supervision over the Pacific Electric Railway and will succeed William Sproule in connection with the various corporations in which the Southern Pacific Company is interested. The railroad governing body also elected Julius Kruttschnitt president of the company, succeeding William Sproule, who resigned to become the federal district director of the United States Railway Administration. Mr. Shoup succeeds W. R. Scott, who resigned as director and vice-president of the Southern Pacific Company to resume his position as federal manager of the Southern Pacific and Western Pacific lines in the Central Western region.

As president of the Pacific Electric Railway since 1912, in which year he succeeded William F. Herrin with that company, Mr. Shoup has been responsible for the management and operation of one of the largest systems of city and interurban lines in the United States. The properties embrace 1060 miles of road, with very diversified service. They are known particularly for their high-grade service and for

Journal Men in Service

Members of the Staff of This Paper in
Many Branches of the Federal
War Service

A card recently received by the editorial staff of the *ELECTRIC RAILWAY JOURNAL* announced the safe arrival in France of L. E. Stibbe, formerly editorial representative for this paper.

Mr. Stibbe enlisted in the engineering branch of the service and was recently promoted to the rank of sergeant. His arrival in France swells the *ELECTRIC RAILWAY JOURNAL* total at the front to three, viz.: Lieut. Frank Kingsley, Ordnance; Lieut. Harold W. McGraw, Infantry; Sergt. L. E. Stibbe, Engineers. Other former *ELECTRIC RAILWAY JOURNAL* men now in the service are A. C. Davison, Infantry, and Harold Rudd, Aviation. The normal staff, editorial and business, at the New York office of the *JOURNAL* consists of about twelve men.

Lieutenant Kingsley was in one of the first contingents to be sent abroad and has seen continuous service there since last November.

In addition to the home office representation, Harry L. Brown, who was Western Editorial representative of the *ELECTRIC RAILWAY JOURNAL* until he entered the Signal Reserve Corps of the United States Army last January,

has been promoted from first lieutenant to captain. Since he entered the military service he has been stationed at Washington in the Radio Division and later the Training Division of the office of the Chief Signal Officer.

Mr. House in Northern States

Technical-Business Executive Returns
to Northern States Power Com-
pany as Manager at St. Paul

Garrett O. House, the superintendent of the St. Paul (Minn.) City Railway, Twin City Lines, has been appointed to succeed the late P. T. Glidden as manager of the Northern States Power Company, St. Paul, Minn. Mr. House is a native of New York State. For fifteen years previous to 1904, when he came to St. Paul, he was engaged in civil engineering work, municipal, state and railroad. He acted as city engineer of Poughkeepsie, N. Y., for several years and was an assistant engineer under the State engineer of New York State engaged in the en-



G. O. HOUSE

largment of the Erie Canal and State highways. He was identified with the location and construction of the Troy & Sand Lake Electric Railway and also with the change in motive power on the Poughkeepsie City Railway from horses to electricity. In 1904 Mr. House went to St. Paul as the representative of Eastern capitalists promoting the public utility corporation now known as the Northern States Power Company. He helped to obtain the necessary franchises and directed the installation of steam and electric equipment. In 1909 Mr. House performed special work, directing the installation of large, electrically operated coal docks for the North Western Fuel Company at Superior, Wis., including 13,000-volt trolley lines and all auxiliary equipment. In 1912 Mr. House became general superintendent of the St. Paul Water Department. He reorganized and readjusted the business methods and equipment of the department. His administration gained the confidence and approval of the general public in St. Paul, demonstrated his ability as a technical-

business executive and indirectly resulted in his appointment a few months ago to the Twin City Rapid Transit Company. He knows well the problems of the Northern States Power Company through his previous long connection with the company at the time of the inception of the enterprise.

F. J. Larsh has been appointed auditor of the Atchison Railway, Light & Power Company, with headquarters at Topeka, Kan., to succeed W. C. Glover.

W. C. Stockman, formerly chief inspector of the Mobile Light & Railroad Company, Mobile, Ala., has been appointed superintendent of transportation.

J. F. Beard has been appointed superintendent of lines of the Birmingham Railway, Light & Power Company, Birmingham, Ala., to succeed B. H. Elliott.

A. Mueller has been appointed superintendent and purchasing agent of the Mankato (Minn.) Electric Traction Company, to succeed E. N. Thyse, resigned.

Louis J. Hauck has been elected vice-president of the Cincinnati, Newport & Covington Light & Traction Company, Covington, Ky., to succeed Clifford P. Garvey.

R. E. Bowen has been appointed engineer of the power station of the Little Rock Railway & Electric Company, Little Rock, Ark., to succeed A. W. Russell.

J. M. Ahearn, assistant superintendent of the Ottawa (Ont.) Electric Railway, has also been appointed purchasing agent, vice D. N. Gill, who has entered military service.

Frederick E. Hayes has been appointed general superintendent of the Sandwich, Windsor & Amherstburg Railway and Windsor & Tecumseh Electric Railway, Windsor, Ont.

G. K. Rudd has been appointed roadmaster of the Cincinnati, Newport & Covington Railway and the South Covington & Cincinnati Street Railway, Covington, Ky., to succeed K. B. Norman.

W. D. Ranshaw has been appointed claim agent of the Cincinnati, Newport & Covington Railway and the South Covington & Cincinnati Street Railway, Covington, Ky., to succeed B. W. Fitzgerald.

R. Harold Smith, who has been managing the Bridgeton (N. J.) Traction Company, has been appointed general manager of the Schuylkill Railway and Schuylkill Electric Company at Girardville, Pa.

A. R. Koonce, formerly master mechanic of the Little Rock Railway & Electric Company, Little Rock, Ark., has been appointed superintendent of the railway department to succeed Richard Elck.

E. D. Loper, formerly master mechanic of the Key West (Fla.) Electric Company, controlled by Stone & Webster, has been appointed master me-

chanic of the Columbus (Ga.) Railroad, also controlled by Stone & Webster.

Robert Allan Stephens, lawyer, Danville, Ill., and secretary of the Illinois Bar Association, has been appointed by Governor Lowden as secretary of the Public Utilities Commission of Illinois. He succeeds Robert V. Prather, Olney.

Clarence R. Manzer, chief clerk of the transportation department of the Chicago (Ill.) Surface Lines, has been commissioned first lieutenant in the Quartermaster's Corps and is now in Washington, D. C. Mr. Manzer held his position with the Surface Lines and the Chicago City Railway for many years.

J. F. Rodgers, superintendent of track and roadway for the Chicago (Ill.) Surface Lines, has been commissioned major in the construction division of the Quartermaster's Department, U. S. Army. Mr. Rodgers held his position with the Chicago Surface Lines since the merger in 1914 and held a similar position with the Chicago City Railway for a period of several years prior to the merger.

N. S. Wiltsie has been promoted to general superintendent of the Bamberger Electric Railroad, Salt Lake City, Utah. He will have charge of all operating departments and the active operation of the line. Mr. Wiltsie has been with the Bamberger line for the last ten years and was recently in charge of the train service, with the title of superintendent of transportation.

William L. Ransom, counsel Public Service Commission for the First District of New York, has in *The Survey* of July 20 an article which discusses in a broad way the necessity of the public paying for utility service and meeting present emergency costs so as to keep essential services unimpaired. Mr. Ransom also believes, as noted in the issue of July 20 in connection with his address before the National Municipal League, that cities in now permitting a disregard of franchise fare limits may properly insist upon other changes in the public interest.

Richard Eick has been appointed purchasing agent of the Little Rock Railway & Electric Company, Little Rock, Ark., to succeed C. J. Griffith, who retains the title of general manager. Mr. Eick has been superintendent of the railway department of the Little Rock Railway & Electric Company since 1911. Before becoming connected with the company, Mr. Eick was division superintendent of the North Jersey Traction Company, from which company he went to the United Railroads, San Francisco, as division superintendent. He resigned from the United Railroads in 1904 to become superintendent of transportation of the Little Rock Railway & Electric Company, which position he held until July, 1911, when he was promoted to the position of superintendent of the railway department.

M. F. Flatley recently resigned as master mechanic of the Dayton & Troy Electric Railway, Tippecanoe City, Ohio, to become master mechanic of the Lackawanna & Wyoming Valley Railroad, Scranton, Pa. Before becoming connected with the Dayton & Troy Electric Railway Mr. Flatley was master mechanic at the Lebanon shops of the Terre Haute, Indianapolis & Eastern Traction Company, in charge of equipment on the Northwestern, Martinsville, Crawfordsville and Lebanon divisions. He became master mechanic of the Terre Haute, Indianapolis & Eastern Traction Company's property in June, 1915, and was previously employed for six years as master mechanic on the Rochester, Syracuse & Eastern Railway. He was also employed by the Brooklyn Rapid Transit System as foreman of the elevated division for four and one-half years, and served three years as foreman of car equipment on the elevated division of the Interborough Rapid Transit System in New York. His first experience in electric railway work was obtained during his connection with the Westinghouse Electric & Manufacturing Company.

R. R. Smith, mention of whose appointment as general manager of the Chicago, South Bend & Northern Indiana Railway, South Bend, Ind., was made in the July 13 issue of this paper, has been connected with the electric railway industry for the last twenty years. He was graduated from the electrical engineering course of Worcester Polytechnic Institute in 1898. After a few months with the Shaw & Ferguson Syndicate, he was appointed superintendent of the Sherbrooke (Que.) Street Railway. In 1901 he became superintendent of the Pawtucket City division of the Rhode Island Company, and in 1896 left there to accept the position as general manager of the Evansville & Southern Indiana Traction Company. He left Evansville to assume charge of the transportation, power and track departments of the Louisville Railway, as traffic manager of that property, leaving there to take the position of general superintendent of the Buffalo & Lake Erie Traction Company. In 1913 he became connected with the Terre Haute, Indianapolis & Eastern Traction Company and Indianapolis Traction & Terminal Company, as purchasing agent for both these properties, which position he resigned to assume the management of the Chicago, South Bend & Northern Indiana Railway.

Obituary

David Morgan, formerly with the Illinois Traction System at Carlinville, Ill., was killed in action in France on June 15. He was a private in the United States Marine Corps.

Construction News

Construction News Notes are classified under each heading alphabetically by States. An asterisk (*) indicates a project not previously reported.

Franchises

San Diego, Cal.—The City Council of San Diego has granted a franchise to the Los Angeles & San Diego Beach Railway for the construction of an extension on Girard Avenue from Prospect Street to Silvarado Street.

Santa Ana, Cal.—War conditions which made it inadvisable and unnecessary for the Pacific Electric Railway to build its proposed extension to Irvine at a cost of \$300,000 have resulted in the company filing a request with the Board of Supervisors asking that an extension of not more than three years be granted the company for completing the work under its county franchise. If the war should end within three years the franchise could then be made operative, according to the petition.

Track and Roadway

Anniston & Camp McClellan Transportation Company, Anniston, Ala.—It was expected that actual construction would be begun on July 20 by the Anniston & Camp McClellan Transportation Company on its line from Anniston to Camp McClellan. The project is estimated to cost about \$300,000. More than \$125,000 has been subscribed. L. L. Crump, Anniston, secretary. [July 6, '18.]

Mobile Light & Railroad Company, Mobile, Ala.—Operation has been begun by the Mobile Light & Railroad Company on its extension to the Chickasaw shipbuilding plant.

Pacific Electric Railway, Los Angeles, Cal.—The City Council of Riverside has denied the petition of the Pacific Electric Railway to abandon its lines on Brockton Avenue and Seventh Street.

Municipal Railways of San Francisco, San Francisco, Cal.—The Board of Supervisors of San Francisco has under consideration the construction of an extension of the line of the Municipal Railways over Army Street to Potrero Avenue, so that service may be afforded to the Union Iron Works, Hunter's Point and the industrial plants in that section of the city.

***Washington, D. C.**—Emergency war measures are under consideration by the authorities for various extensions of the street railway systems in Washington so as to afford more adequate means of transportation to and from the many new government buildings in

West Potomac Park and the section of the city south of Pennsylvania Avenue and west of Seventeenth Street. A plan said to be favored by the Public Utilities Commission of the District of Columbia calls for the construction of a "belt" line having physical connection with existing lines from all points in the city and suburbs. The Secretaries of War and Navy are in correspondence with the District Commissioners on the subject and a plan of action will be adopted in a short time.

Gary (Ind.) Connecting Railways.—The Public Service Commission of Indiana has issued an order denying the petition of Charles M. Alford to discontinue that part of the Gary Connecting Railways from Gary to Woodville Junction.

Louisville & Interurban Railway, Louisville, Ky.—The newspapers of Louisville have been conducting a campaign in an effort to get the Louisville & Interurban Railway to extend its line to West Point, Ky., for the purpose of giving the soldiers stationed at the artillery range at that place an opportunity of coming to Louisville on the electric line instead of having to depend on the steam roads. So far the company has not declared any intention of extending the line.

New Orleans Railway & Light Company, New Orleans, La.—Work will be begun at once by the New Orleans Railway & Light Company on the relocation of its tracks on Dauphine Street from Poland and Jourdan Avenues to North Rampart Street.

Boston & Maine Railroad, Boston, Mass.—A new signal tower will be erected by the Boston & Maine Railroad in the Charleston district of Boston. The structure will be about 25 ft. x 40 ft., and will be two stories high. The cost is estimated at \$10,000. The H. Wales Lines Company, Meriden, Conn., is the building contractor.

United Railways, St. Louis, Mo.—Construction is under way by the United Railways of an extension of its Hamilton Avenue line through the Hi-Pointe subdivision, and it is expected that the line will be completed in September.

Public Service Railway, Newark, N. J.—Plans are being made by the Public Service Railway for immediate work on the extension of its system on the west side of the Hackensack River. The extension is planned to provide transportation facilities for workers engaged at the plant of the Federal Shipbuilding Company and other plants in this vicinity.

Cincinnati & Dayton Traction Company, Cincinnati, Ohio.—Extensive improvements in the equipment, properties and service of the Cincinnati, Dayton & Toledo Traction Company, which

connects Cincinnati, Hamilton, Middletown, Franklin, Miamisburg, Dayton and Germantown are being planned by the Cincinnati & Dayton Traction Company which recently took over the operation of the line.

***Miami, Okla.**—A committee has been appointed by the Miami Business Men's League to build and operate an electric or other interurban railway through the Miami mining district, at an estimated cost of about \$650,000. Among those appointed were Dr. W. L. McWilliams, George L. Coleman, John Cheyne and G. W. Dick.

Wheeling (W. Va.) Traction Company.—The construction of a new approach to the Steubenville (Ohio) bridge across the Ohio River is under way by the Wheeling Traction Company. When this construction is completed through car service will be inaugurated between Steubenville and Wheeling, W. Va. For this service the company recently purchased nine new steel center-entrance cars. Seven of these cars will be required to maintain the schedule. Each car has a seating capacity of seventy persons and is 57 ft. 10 in. long.

Shops and Buildings

Washington, Baltimore & Annapolis Electric Railway, Baltimore, Md.—This company has acquired half a block in Baltimore, bounded by Eutaw, Lombard, Howard and Pratt Streets, and plans to construct a terminal station and additional tracks. The cost is estimated at about \$300,000.

Public Service Railway, Newark, N. J.—A new car shop will be built by the Public Service Railway at Bloomfield Avenue and Lake Street, Newark. The structure will be of brick, 162 ft. x 50 ft., one story high, and will cost about \$45,000. The company will also make some alterations in its office and storage building at the same location.

Power Houses and Substations

Georgia Railway & Power Company, Atlanta, Ga.—A new high-tension line has been installed by the Georgia Railway & Power Company from the Dunlap plant to feed the two mills of the Pacolet Manufacturing Company at Gainesville and New Holland. The mills will consume about 6000 hp. Four 2000-kva. transformers, one to be held in reserve, were installed to supply power from the 110,000-volt current brought in by the Tallulah Falls lines. A 110,000-volt switch was moved from Cartersville to the Dunlap substation to control the bank of transformers.

Maryland Electric Railways, Annapolis, Md.—A report from the Maryland Electric Railways states that its substation formerly located at Baltimore has been moved 6 miles south to Linthicum.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS

FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES • MARKET QUOTATIONS • BUSINESS ANNOUNCEMENTS

Heavy Sales of Coils for Traction Road Service

Traction Companies Heretofore Having Their Own Winders Forced Into Market by Labor Shortage

Unexpectedly the sale of coils for electric railway equipment was greatly augmented during the season now about closed. At the present time the demand has fallen off, excepting for obligatory replacements and maintenance of rolling stock in actual operation. It is the custom to provide coils for the rehabilitation of cars withdrawn from service during the off-season, which is in the late winter and all through the spring months.

It has been the practice of traction companies and public utility companies, generally, particularly throughout the East, to wind coils in their own shops. For lack of skilled winders, and a shortage of every kind of expert labor, many railways were obliged this year to purchase their supply for 1918-1919 in the open market from manufacturers specializing on such equipment.

Prices for coils have been fairly steady, with increases coming along at intervals with the changes in the cost of metals and other essential material. The scarcity of labor competent for winding of coils has also been a factor of the first importance with production costs in this highly specialized field. The latest advance was 15 per cent, announced about sixty days ago. Manufacturers do not look for any further increase, at least this year.

Activity in Specialties Market

Holden & White, Inc., Chicago, report unusual activity on the part of electric railways in the purchase of their car equipment specialties. For example, they have received in the last few days a large number of orders for Perry-Hartman side and center bearings, Garland ventilators, Anderson slack adjusters and Miller trolley shoes. Among those who have purchased bearings are the West Penn Traction Company; Buffalo & Lake Erie; Honolulu Rapid Transit Company; Houston Electric Company; Michigan Railway; Levis County Railway; Oklahoma Railway; Buffalo, Lockport & Rochester; West Chester Street Railway; Union Traction Company of Indiana; North Branch Rapid Transit Company; Emergency Fleet Corporation; Schuylkill Railway.

Garland ventilators have been ordered for new cars being built for the Fort Wayne & Northern Indiana, the Public Service Railway, and the Rich-

mond Light & Railway Company. Considerable quantity orders for Miller trolley shoes have been received from the International Railway; Waterloo, Cedar Falls & Northern; Elgin & Belvidere; Dayton & Troy Electric Company; Milwaukee Electric Railway & Light Company; Salt Lake, Garfield & Western; East St. Louis & Suburban Railway, and the Aurora, Elgin & Chicago Railway.

Bituminous and Anthracite Production Increased

Requirements of Fuel Administration Being Reached—Shipping Record Also Heavy

A record-breaking production of bituminous coal, quoting the weekly report of the United States Geological Survey, marked the week of July 13. The output (including lignite and coal made into coke) is estimated at 13,243,000 tons, an increase over the week of July 6 (five working days) of 2,987,000 net tons or 29 per cent and over the current week of last year of 1,479,000 net tons or 12.5 per cent. The average production per working day is estimated at 2,207,000 net tons as against 2,051,000 net tons during the week of July 6, or an increase of 7.6 per cent, and as compared with the average production per working day of 1,961,000 net tons during the week of July 13, 1917.

The output during the current week of 13,243,000 net tons is approximately 1,031,000 net tons, or 8 per cent, above the average weekly requirements of 12,211,500 net tons established by the United States Fuel Administration. However, the average weekly production for the coal year to date is estimated at 11,568,000 net tons or 5.3 per cent behind the weekly requirements. In order to make up the deficit for the coal year from April 1 to date of 643,000 net tons per week or 9,651,000 net tons, it will be necessary to have approximately ten more weeks of production equivalent to that of last week, or a production of 12,472,000 net tons during each of thirty-seven remaining weeks in the coal year ended March 30, 1919, a figure only twice attained—the week ended June 15 and the current week. Reports from the carriers show increased shipments for the week of July 13, ranging from 26 to 36 per cent.

Anthracite shipments for the week were also vastly increased, the records showing 48,331 cars of anthracite, against 31,493 cars during the week of July 6.

Future Bright for the Buying of Railway Equipment

Careful Survey of Eastern Field Leads to This Conclusion—Price Increases New and Prospective

With manufacturers and sales representatives urging traction road managers to place orders for maintenance and replacement equipment for the fall and winter, buying during the past week is rather sluggish. Optimism is not lacking, however. A well-known supply agent returning from a personal survey of the field in the East stated that railway buying was looking up. He believed that before the year is out a number of the electric lines will be in the market for a quantity of new equipment. Orders for current replacements in volume and value compare favorably with the same season in 1917. The increase in prices on many accessory lines has deterred buying, so much so that houses make announcements of this character, which are considered unavoidable under present conditions, with more or less reluctance.

LIFE GUARDS ADVANCE 10 PER CENT—FENDER MATERIAL TO FOLLOW

About a week ago an increase of 10 per cent was made on life guards. Material for fenders is difficult to obtain and when the stock now in hand is exhausted an advance in price will follow. Manufacturers therefore advise the early placing of orders.

The supply of rattan for car seatings is approximating a state of acute shortage. Prices have been revised only at long intervals, but the indications are now that higher quotations will be in order if the rattan situation does not improve.

On bells and gongs trade is active and sales are increasing. Within a month one manufacturer, who said the revision was general, increased his prices from 10 to 25 per cent. Deliveries from stock are fairly prompt.

An announcement that copper wire has been advanced \$50 a ton, which aroused some comment, only means that the apparently higher price is that of the official figures on copper given in detail in the *ELECTRIC RAILWAY JOURNAL* of July 6, as against the former quotation of 23½ cents a pound.

GEARS AND PINIONS ACTIVE

Managers and purchasing agents are in the market for gears and pinion requirements for 1919. A number of large orders have been booked, and conditions are such that promises are given on a definite basis. On July 12

an increase of 12½ per cent was made on gears and pinions, both for cast and forged, by a Western manufacturer. Heretofore a differential in price existed, but both kinds are now placed on the same selling basis. The buying is on a more generous scale than for some time.

Inquiries for snowplow equipment are coming along in increasing numbers. Manufacturers have accepted orders from prominent traction companies, East and West, for early and late fall shipment. Prices remain unchanged, although each specification is treated individually from the factory's viewpoint.

Various grades of plush car seatings were advanced from 5 to 7½ per cent on July 1 by one of the leading manufacturers in the East. The same company on July 8 also announced an increase of 5 to 12½ per cent on imitation leather goods employed in the production of seatings and curtains for electric cars. The higher cost is owing to the increased cost of material—cotton drills, sheetings and other goods used in the backing of the artificial leather.

Shortage in Track Hardware Generally Admitted

**Bolts and Nuts on Longer Delivery—
Fish Plates, Tie Plates, Etc.,
Go Out of Stock**

Following a scant supply of many items in the list of electric railway supplies and accessories, the presumption was that in this category would fall nearly everything of iron and steel. Manufacturers and sales agencies producing and handling these goods have stated at various times that the shortage in certain lines was becoming more acute. Under the conditions with which nearly all the primary metals are distributed for commercial manufacture, being under the control of the government, the supposition that track hardware was short seemed more than probable.

Careful inquiry among producers and sellers of the goods in question proved that in some respects a shortage exists, at least for bolts and nuts of some sizes. Track bolts, mill supply, can be delivered in from thirty to sixty days. Nuts in thirty days. Fish plates, tie plates, angle plates, angle bars, tie rods, mill supply, deliveries on some are from stock, with shipments going forward, without priority preference, whenever the embargoes will permit. Deliveries on rollings can be made in from two to three weeks. Prices on these lines are under government control, and follow the quotations made in the regular market for electric railway materials of the *ELECTRIC RAILWAY JOURNAL*, on another page in this department.

A Wall Street report that no agreement had yet been reached between the steel men and the War Industries Board on the price of rails is authoritatively stated as being without founda-

tion. The prices ruling for the past three months for T-rails, A.S.C.E. standard, in various quantities, still prevail. The quotations on T-rail, high (Shanghai) and grooved girder rails are also unchanged. Traction compan-

Rolling Stock

Connecticut Company, New Haven, Conn., is reported as contemplating the purchase of twenty one-man and fifteen interurban cars, for which specifications are under way.

Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., which recently placed an order for thirty-one one-man cars with the American Car Company as noted in the *ELECTRIC RAILWAY JOURNAL* of last week, is reported as having delivery promised by Oct. 1.

Monongahela Valley Traction Company, Fairmont, W. Va., has placed orders for twelve new cars, two of which are express. The order has been placed with the Jewett Car Company, Newark, Ohio, which agrees to supply them within thirty to forty-five days after it receives the steel for their construction. The company has already secured the steel at Bridgeport, Pa., which was shipped to Newark on July 12, therefore the cars should be delivered by Sept. 1. The four interurban cars have been ordered from the same company which agrees to deliver four months after it receives the steel herewith, now being arranged for. The Kuhlman Car Company has been awarded the contract for six light double-truck car bodies to be delivered in four months. This purchase of cars mentioned in the *ELECTRIC RAILWAY JOURNAL* of June 29 puts the rolling stock of the Monongahela Valley Traction Company in fine condition. This is one of the largest orders for equipment for electric railways ever given by a West Virginia concern. Specifications for the city and suburban cars follow:

CITY CARS

Number of cars ordered.....	6
Date order was placed.....	July 3, 1918
Date of delivery.....	Four months
Builder of car body.....	Kuhlman
Type of car.....	Pay-as-you-enter, double truck, city service
Seating capacity.....	40
Weight:	
Car body.....	15,500 lb.
Trucks.....	11,000 lb.
Equipment.....	6,400 lb.
Total.....	32,900 lb.
Bolster centers, length.....	16 ft. 3½ in.
Length over all.....	40 ft. 6 in.
Truck wheelbase.....	5 ft. 0 in.
Width over all.....	8 ft. 4 in.
Height, rail to trolley base.....	10 ft. 8½ in.
Body.....	All steel
Headlining.....	Composition
Roof, arch or monitor.....	Arch
Air brakes.....	Westinghouse Traction Brake—straight
Armature bearings.....	Plain
Axles.....	Carnegie hammered steel
Bumpers.....	Channel
Car signal system.....	Faraday
Car trimmings.....	Plain
Center and side bearings.....	Plain
Control.....	K-35 with line switch
Designation signs.....	Hunter
Door operating mechanism.....	National Pneumatic
Fenders or wheelguards.....	H-B
Gears and pinions.....	Nuttall "BP"
Hand brakes.....	Peacock

ies are not very active in looking out for rail requirements at present, although making inquiries; but are expected to come into the market before the close of the year, if the financial situation warrants.

Heater equipment.....	Consolidated Car Heating Co.
Headlights.....	G. E.
Journal boxes.....	Symington
Lightning arresters.....	West
Motors, type and number.....	4 West 506-A, inside hung
Registers.....	Ohmer
Sanders.....	De France
Sash fixtures.....	Brill Renitent
Seats.....	Brill conforming longitudinal rattan
Step treads.....	Feralun
Trolley catchers or retrievers.....	Knutson No. 2
Trolley base.....	Nuttall
Trucks.....	Standard C-50 depressed side frame
Wheels.....	26-in. forged steel

SUBURBAN CARS

Number of cars ordered.....	4
Date of delivery.....	Four months from delivery of steel
Date order was placed.....	July 3, 1918
Builder of car body.....	Jewett Car Co.
Type of car.....	Suburban passenger car
Seating capacity.....	48
Weight:	
Trucks.....	15,500 lb.
Equipment.....	6,400 lb.
Bolster centers, length.....	21 ft. 0 in.
Length over all.....	48 ft. 0 in.
Truck wheelbase.....	6 ft. 1 in.
Width over all.....	8 ft. 6 in.
Body.....	All steel
Headlining.....	Agasote
Roof, arch or monitor.....	Arch
Air brakes.....	Westinghouse straight air
Axles.....	A E R A—E B
Bumpers.....	Angle
Car signal system.....	Consolidated
Car trimmings.....	Plain
Center and side bearings.....	Plain
Conduits and junction boxes.....	Plain
Control.....	Westinghouse K-35G
Couplers.....	Radial
Curtain fixtures.....	Curtain Supply Co.
Curtain material.....	Pantafote
Designation signs.....	Hunter
Gears and pinions.....	Nuttall—"BP"
Hand brakes.....	Peacock
Heater equipment.....	Consolidated Car Heating Co., electric
Headlights.....	G. E.
Journal boxes.....	Symington
Lightning arrestors.....	Westinghouse
Motors, type and number.....	4 Westinghouse 306-CV-4, inside hung
Paint, varnish or enamel.....	Standard
Registers.....	Ohmer
Sanders.....	De France
Seats.....	Male & Kilburn
Seating material.....	Rattan
Slack adjuster.....	American Slack Adj.
Springs.....	Semi-elliptic
Trolley catchers or retrievers.....	Knutson No. 2
Trolley base.....	Nuttall
Trucks.....	Standard Motor Truck Co., C-50-P
Wheels.....	Carnegie hammered steel 34 in.

San Diego (Cal.) Electric Railway, while not in the market for new cars, is to have a hearing before the Railroad Commission of California on Aug. 7 out of which some suggestions for one-man cars may come. Whether the company will change its own cars or purchase new ones, states W. Clayton, vice-president and managing director, depends upon a great number of conditions which it is impossible to anticipate at present.

Boston (Mass.) Elevated Railway has placed with the J. G. Brill Company an order for the bodies for 200 center-entrance motor cars, 47 ft. 5 in. over end posts, and for fifty center-entrance trailers, 46 ft. 10 in. over end posts. The motor trucks are to be Brill 77-E and the trailer trucks are to be Standard arch-bar type. These cars are duplicates of the latest center-

entrance multiple-unit cars now operating in the East Boston tunnel. The order for the electrical equipment has been evenly divided between the Westinghouse and General Electric companies.

Trade Notes

I. D. Landis has been appointed sales manager of the John D. Godfrey Company, Elkhart, Ind., manufacturer of coal-handling equipment.

Rutherford & Uptegraff, in the First National Bank Building of Pittsburgh, Pa., have been appointed exclusive representatives in the Pittsburgh and near-by territory for the Electrical Engineers' Equipment Company of Chicago.

Under-Feed Stoker Company of America, Chicago, Ill., has removed its office in Cincinnati, Ohio, from the Union Trust Building to the Union Central Building, Fourth, Vine and Baker Streets, where S. A. Williamson is the company's representative.

L. D. Calhoun has been appointed as assistant sales manager of the Square D Company, manufacturer of electrical safety switches at Detroit, Mich. Mr. Calhoun has been advertising manager of the company for the past year, and in addition to his new duties will continue to handle the company's advertising, etc.

F. A. Mansfield, formerly connected with the sales department of the West-

inghouse Electric & Manufacturing Company at East Pittsburgh, Pa., has resigned to take the position of Pittsburgh district sales manager of the Mechanical Appliance Company at Milwaukee, Wis. This company manufactures a complete line of alternating-current and direct-current motors, small generators, motor-generator sets and inverted rotaries.

Le Carbone Company, a French concern with wide American affiliations, manufacturing carbon brushes, has sent the following cable to its representative in the United States, W. J. Jeandron, New York City, showing the great ties of friendship which bind the French and American republics together: "Advise all our friends what admiration and gratitude France is feeling for the gigantic effort of sister republic. Thursday, July 4, was also our national day."

Bound Brook Oil-less Bearing Company, Bound Brook, N. J., has perfected arrangements whereby every employee who has been in the service of the company for three months is insured to the amount of \$500, increasing with the length of service, payable at his death to whomever he may direct the policy to be issued. The entire expense of the policy is paid by the company. The insurance will apply to the employees of the company's three plants: Plant No. 1 at Bound Brook, N. J., and Plants Nos. 2 and 3 at Lincoln, N. J.

United States Railroad Administration, division of public service and accounting, on July 11 issued circular No. 16, which deals with the matter of

bonds to be required in connection with the extension of credit for transportation charges, as prescribed in general order No. 25, effective Aug. 1. The bonds covering the extension of credit will be of two classes, namely, (1) to cover patrons transacting business at one or more points with one carrier; (2) to cover transactions at one point with two or more carriers. Details applicable to both classes of bonds are furnished. Copies of this order may be obtained by applying to the regional director.

New Advertising Literature

Bush Electric Tool & Manufacturing Works, Redlands, Cal.: Catalog describing safety tools for use on high-tension lines, with illustrations showing the tools used in actual practice.

Holophane Glass Company, New York, N. Y.: Handsomely illustrated thirty-six-page book on street lighting. Diagrams are given showing how energy in lighting may be conserved through the use of scientific methods. There are suggestions also for obtaining artistic effect.

Westinghouse Church Kerr & Company, New York, N. Y.: Map of the United States, in colors, inclosed in stiff covers, showing, by designating marks, location of construction work, consulting engineering projects and engineering and construction done under the supervision of this company.

NEW YORK METAL MARKET PRICES

	July 17	July 24
Copper, ingots, cents per lb.	26	26
Copper wire base, cents per lb.	29.25	29.25
Lead, cents per lb.	8.05	8.05
Nickel, cents per lb.	40	40
Spelter, cents per lb.	8.87	8.62
Tin, Chinese, cents per lb.	92	94
Aluminum, 98 to 99 per cent., cents per lb.	†33.00	†33.00

* No Straits offering. † Government price in 50-ton lots or more, f. o. b. plant.

OLD METAL PRICES—NEW YORK

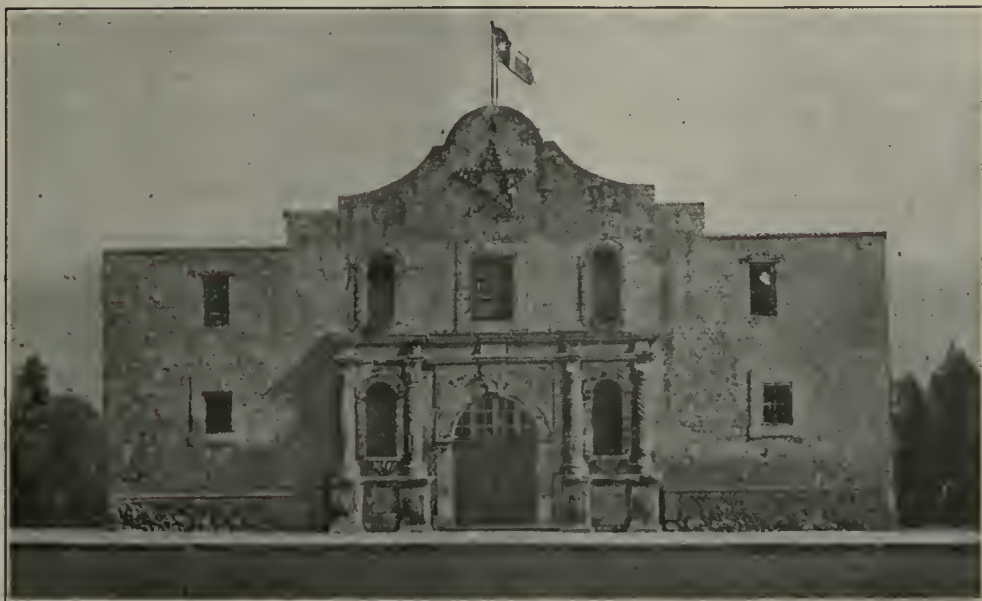
	July 17	July 24
Heavy copper, cents per lb.	23	23
Light copper, cents per lb.	20	20
Red brass, cents per lb.	22	22
Yellow brass, cents per lb.	14	14
Lead, heavy, cents per lb.	7	7
Zinc, cents per lb.	31	31
Steel car axles, Chicago, per net ton.	\$41.52	\$41.52
Old carwheels, Chicago, per gross ton.	\$29.00	\$29.00
Steel rails (scraps), Chicago, per gross ton.	\$34.00	\$34.00
Steel rails (relaying), Chicago, gross ton.	\$60.00	\$60.00
Machine shop turnings, Chicago, net ton.	\$16.25	\$16.25

ELECTRIC RAILWAY MATERIAL PRICES

	July 17	July 24
Rubber-covered wire base, New York, cents per lb.	30 to 39	30 to 37
Weatherproof wire (100 lb. lots), cents per lb., New York.	32.10 to 32.40	36.75
Weatherproof wire (100 lb. lots), cents per lb., Chicago.	33.42 to 35.00	37.50
T rails (A. S. C. E. standard), per gross ton.	\$70.00 to \$80.00	\$70.00 to \$80.00
T rails (A. S. C. E. standard), 100 to 500 ton lots, per gross ton.	\$67.50	\$67.50
T rails (A. S. C. E. standard), 500 ton lots, per gross ton.	\$62.50	\$62.50
T rail, high (Shanghai), cents per lb.	4	4
Rails, girder (grooved), cents per lb.	4	4
Wire nails, Pittsburgh, cents per lb.	3	3
Railroad spikes, drive, Pittsburgh base, cents per lb.	4	4
Railroad spikes, screw, Pittsburgh base, cents per lb.	8	8
Tie plates (flat type), cents per lb.	3	3
Tie plates (bracket type), cents per lb.	3	3
Tie rods, Pittsburgh base, cents per lb.	7	7
Fish plates, cents per lb.	3	3
Angle plates, cents per lb.	3	3
Angle bars, cents per lb.	3	3
Rail bolts and nuts, Pittsburgh base, cents per lb.	4.90	4.90
Steel bars, Pittsburgh, cents per lb.	5	5
Sheet iron, black (24 gage), Pittsburgh, cents per lb.	4.90	4.90
Sheet iron, galvanized (24 gage), Pittsburgh, cents per lb.	5.80	5.80
Galvanized barbed wire, Pittsburgh, cents per lb.	4.35	4.35

	July 17	July 24
Galvanized wire, ordinary, Pittsburgh, cents per lb.	3.95	3.95
Car window glass (single strength), first three brackets, A quality, New York, discount.	80%	80%
Car window glass (single strength), first three brackets, B quality, New York, discount.	80%	80%
Car window glass (double strength, all sizes AA quality), New York discount.	82 & 3%	82 & 3%
Waste, wool (according to grade), cents per lb.	11 to 22	11 to 22
Waste, cotton (100 lb. bales), cents per lb.	13 to 13	13 to 13
Asphalt, hot (150 tons minimum), per ton delivered.	\$38.50	\$38.50
Asphalt, cold (150 tons minimum, pkgs. weighed in, F. O. B. plant, Maurer, N. J.), per ton.	\$42.50	\$42.50
Asphalt filler, per ton.	\$45.00	\$45.00
Cement (earload lots), New York, per bbl.	\$3.20	\$3.20
Cement (earload lots), Chicago, per bbl.	\$3.34	\$3.34
Cement (earload lots), Seattle, per bbl.	\$3.68	\$3.68
Linseed oil (raw, 5 bbl. lots), New York, per gal.	\$1.80	\$1.82
Linseed oil (boiled, 5 bbl. lots), New York, per gal.	\$1.81	\$1.83
White lead (100 lb. keg), New York, cents per lb.	10	10
Turpentine (bbl. lots), New York, cents per gal.	73	66

* Government price. † These prices are f. o. b. works, with boxing charges extra.



Remember the Alamo!

This doesn't look like a 200-year old building that had gone through one of the bloodiest "shot-ups" of American History. The Spanish missionaries put honest effort into their building and that's why Time is easy on their structures.

For a parallel take the Peacock Brake of which there have been scores in use at San Antonio for years. Like the Alamo it endures because it is *built honestly*. Maintenance is unknown.

Furthermore, the Peacock is *sold honestly*. When you ask us about a brake we first ask you to answer questions that we know are vital to your getting the best brake for a particular set of conditions. For

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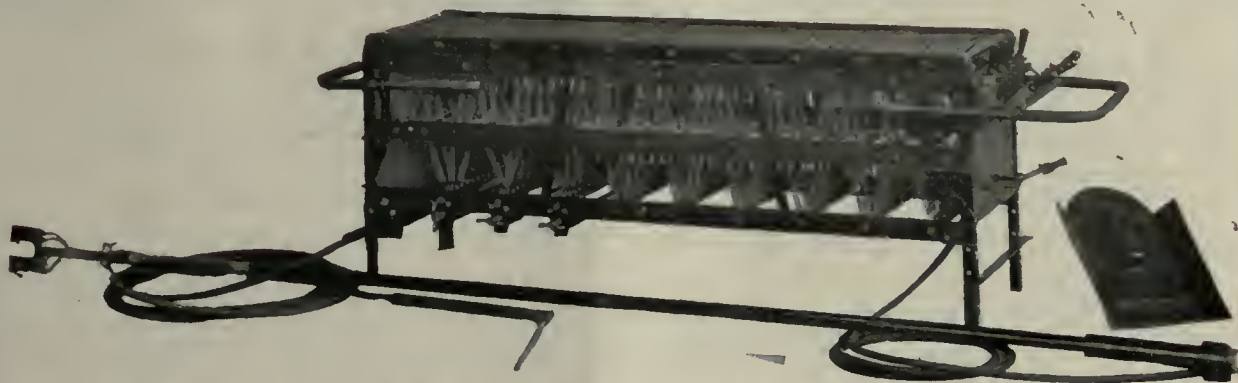
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There's a lot more to making a good bearing lining than pouring the metal into a mold.

There's the right formula for the service; and the need for seeing that the mixture is made at just the right temperature so the metals will really mingle.

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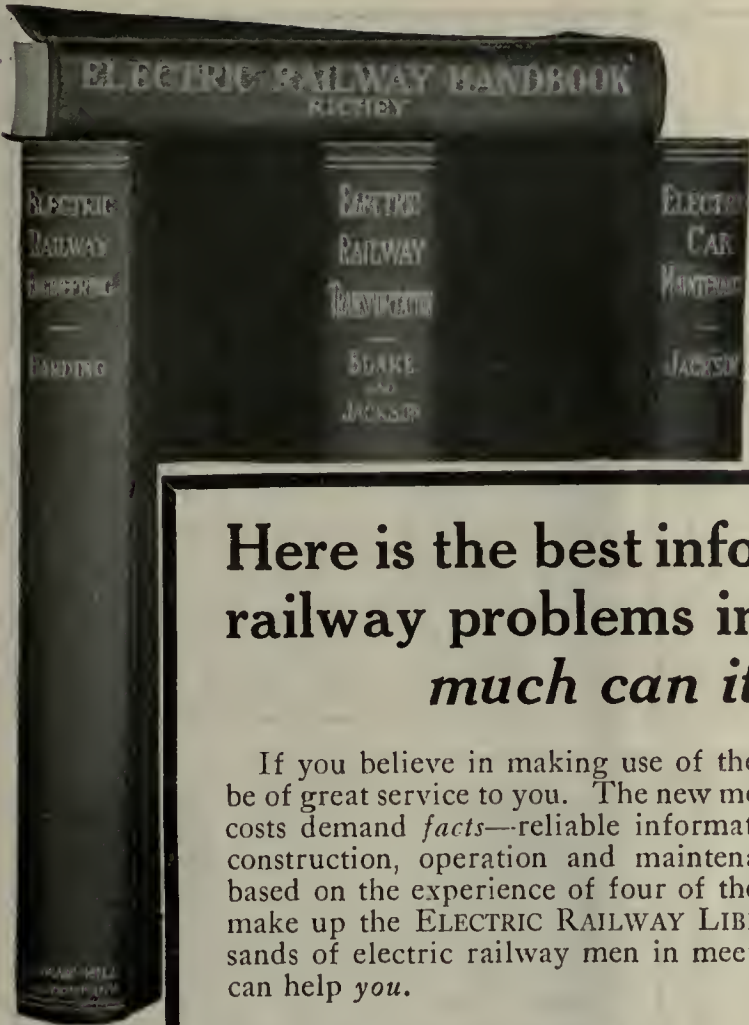
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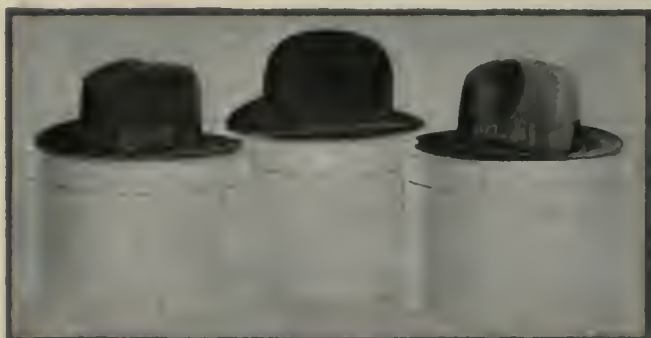
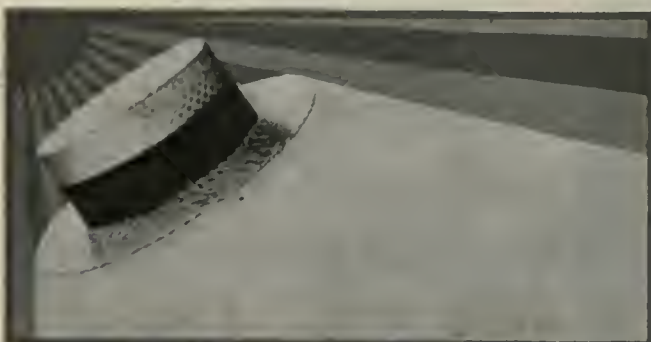
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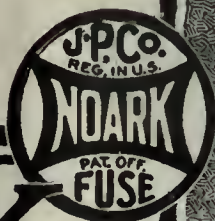
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By the patented Lincoln process, the work is done so quickly that repairing may be done without interrupting regular traffic schedules. The Lincoln Dynamotor welds so thoroughly that the welded section will "stand up" as long as the rail to which it is applied. The Lincoln outfit is light in weight, all self-contained in a wheel cart, so it can easily be taken to and from the job by one or two men. The same outfit can be used later for welding joints and bonding new rails. It will pay you to get the facts of the Lincoln outfits. When may we explain in detail?

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Every piece of idle equipment, unnecessary material or scrap represents **WASTE!**

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—the *space* it occupies costs money and may be needed for other purposes.

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—the *material* it represents would be a welcome addition to present short stocks.

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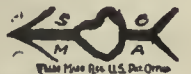
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for such purposes you know that it is going to give service for a long time, and that you are *not* going to be up against a continuous big *labor cost* for renewals and replacements.

Of course even Cypress may eventually have to be replaced. Nothing lasts quite forever. But in the long service life you get from Cypress you will have *saved* a lot of labor costs in *maintenance alone*.

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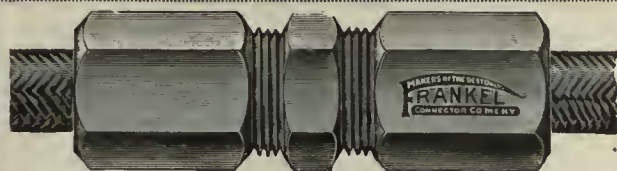
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make safe welding easy. You would find it decidedly to your advantage to give ARMCO Rods a careful test.

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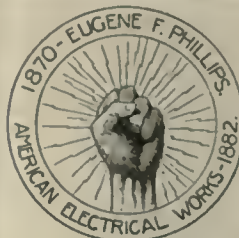
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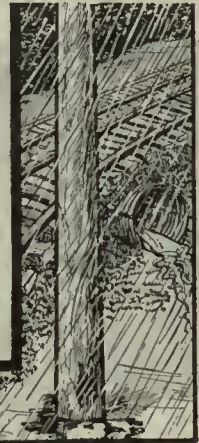
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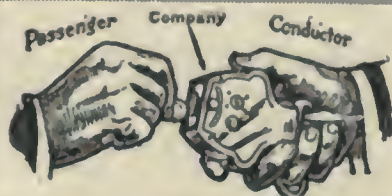
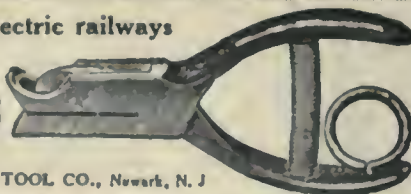
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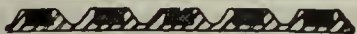


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SEARCHLIGHT SECTION

NOTICE OF TRUSTEES' SALE

In the United States District Court for the Western District of North Carolina, at Greensboro.

In the matter of

SOUTHERN CAR CO. BANKRUPT

In pursuance of an order to me directed, I will, on the

8th day of August, 1918 at 2 o'clock

p. m., on the premises of the Southern Car company in the City of High Point, North Carolina, expose to sale at public auction for cash all of the real and personal property belonging to said bankrupt, the personal property consisting of the following:

	Appraisal Value
Machinery (electrical)	\$9,748.68
Machinery	25,907.20
Tools	2,301.10
Sundry Supplies	4,285.60
Lumber	616.60
Shifting and pulleys	992.00
Piping	1,077.30
Pipe and fittings	1,298.16
Office Furniture & fixtures	1,222.00
Supplies	8,449.65

and the real estate being more particularly bounded and described as follows:

All those certain lands, pieces or parcels of land, situated, lying and being in the City of High Point, county of Guilford, State of North Carolina, and bounded and more particularly described as follows, to-wit:

Beginning at an iron stake in the center of Southern Railroad's main line track, Hankin Coffin and Casket Co.'s northwest corner; thence along center of said Southern Railroad south 33 degrees, 30 minutes west 411.75 feet to an iron stake in east side of Southern Ave.; thence along said Southern Ave. south 51 degrees, 10 minutes east 119.80 feet to an iron stake, southeast corner of said Southern Ave.; thence along Southern Ave. south 38 degrees, 40 minutes west 326.15 feet to an iron stake, corner of Southern Ave.; thence with grove (see blue print) 81 feet, more or less, to an iron stake, corner Southern Ave.; thence along said Southern Ave. south 51 degrees 10 minutes east 156 feet to an iron stake, Southern Power Co.'s northwest corner; thence along line of said Southern Power Co. north 38 degrees, 50 minutes east 100 feet to an iron stake, Southern Power Co.'s northeast corner; thence along the line of said Southern Power Co. south 51 degrees 10 minutes east 174 feet to an iron stake, said Southern Power Co.'s southeast corner; thence along line of said Southern Power Co. south 38 degrees 50 minutes west 100 feet to an iron stake on east side of Southern Ave.; thence along line of said Southern Ave. south 51 degrees 10 minutes east 239.11 feet to an iron stake, E. H. C. Fields' angle in Redding St., E. H. C. Fields south 84 degrees 15 minutes east 209 feet to an iron stake, intersection of Redding St. and Myrtle Ave.; thence along the line of Redding St., north 45 degrees 30 minutes east 192 feet to an iron stake at angle in Redding St., E. H. C. Fields' corner north 43 degrees 45 minutes east 20350 feet to an iron stake said E. H. C. Fields' corner; thence along line of said Fields north 30 degrees 30 minutes west 571.60 feet to an iron stake in Hankin Coffin and Casket Co.'s line, thence along line of said Hankin Coffin and Casket Co. south 28 degrees 30 minutes west 18.60 feet to an iron stake Hankin Coffin and Casket Co.'s southwest corner thence along the said line of said Hankin Coffin and Casket Co. north 50 degrees west 300 feet to the beginning, containing 14.76 acres more or less.

The terms of sale to be cash on confirmation by the court, said sale to be reported by me at an adjourned meeting to be held on August 9, 1918, the highest bidder to deposit certified check for ten per cent. (10 per cent.) of his bid pending confirmation by the court on August 9th.

This July 1, 1918.

W. A. COPELAND,

Trustee in Bankruptcy of Southern Car Company.

TRUSTEES' SALE— STREET RAILWAY PROPERTY

Notice is hereby given that under and by virtue of that certain decree of sale, made and entered on the 28th day of June, 1918, by the Honorable Rhydon M. Call of the United States District Court for the Southern District of Florida, in Chancery, in that suit therein pending where Charles M. Allen is complainant and

ST. PETERSBURG & GULF RAILWAY COMPANY

a corporation is defendant, and the undersigned as Trustees under that certain Decree of Trust executed by the said Railway Company on the First day of August 1918, as intervenor, the undersigned such Trustees will sell, at the main office of St. Petersburg & Gulf Railway Company, in the City of St. Petersburg, Florida, on

MONDAY, AUGUST 5th, A.D., 1918

the same being legal holiday, between the hours of 11 a. m. and 2 p. m., to the highest and best bidder, the property covered by said Decree of Trust and described in said Decree of Sale, to-wit:—

The following Rolling Stock, consisting of seven-teen passenger cars, three work cars, one freight car, seven truck flat cars.

Also the following Track and Overhead, together with all wires, poles and fixtures, road bed ties, rails, franchises, rights or way, or otherwise, used in connection with said track and overhead equipment, as the same is now located over and upon and along the streets and portions of the City of St. Petersburg, Florida, and vicinity, the streets of Gulfport, Florida and vicinity and County Roads of Pinellas County, Florida, consisting of 20.75 more or less, miles of track composed of Davis and Jungle Line commencing at the intersection of Beach Drive and Central Avenue and extending Westward on Central Avenue to Park Street North and thence north-westward on Park Street North to road leading to Jungle Dock, and thence Westward on said road leading to Jungle Dock to and over said Jungle Dock to the western end thereof; also Gulfport Line commencing at the intersection of Ninth Street South and Central Avenue thence extending Southward on Ninth Street South to Tangerine Avenue, thence Westward on Tangerine Avenue to Davis Boulevard, thence Southward on Davis Boulevard to and over the Gulfport Dock to the southern end thereof; also Hix Hayou Line (being composed of lines constructed under two leases one from Bayou Investment Co., Inc., Bayou Investment Company, and the other from Roy S. Hanna Trustee to St. Petersburg & Gulf Railway Company), the line constructed under the first lease commencing at the intersection of Fifth Street South and Central Avenue, thence extending Southward on Fifth Street South to 6th Avenue South, thence eastward on 6th Avenue South to Third Street South, thence Southward on Third Street South to Fifteenth Avenue South, and thence Eastward on Fifteenth Avenue South to shore of Bayou Hix; and the balance of the line constructed under the lease from Hanna commencing at a point on the last above described course about five hundred feet Westward from the terminus on the shore of Tampa Bay, and thence extending Southward, Southwestward and again Southward on an irregular course to a point on the western shore of Bay Hix; also Seminary and North Ninth Street Line composed partly of the original trackage and partly of trackage under two leases one from C. W. Spruitstead, Trustee, to St. Petersburg & Gulf Railway Company, and the other from C. H. Smith and J. C. Hix, Trusts, to St. Petersburg & Gulf Railway Company, the trackage originally constructed commencing at the intersection of Second Street North and Central Avenue, thence Northward on Second Street North to Seventh Avenue North, thence Westward on 7th Avenue North to Ninth Street North, thence Northward

Ninth Street North to a point at or near the intersection of Tenth Street North and Ninth Street North; continuing from the last named intersection and built and operated under the Pinkstated lease the line runs Northward on Ninth Street North to the intersection of Johns Pass Road and continuing northward from this point the line was built and is operated under the lease from Reed and Hammett and extends Northward on Ninth Street North to 34th Avenue North and thence Eastward on 34th Avenue North to the Seminary, being at or near the intersection of Bay Street also Coffee Pot Line commencing at the intersection of Seventeenth Avenue North and Second Street North and extending Eastward on Second Street North to Oak Street, thence Northward on Oak Street to Ninth Avenue North, thence Eastward on Ninth Avenue North to Locust Street, and thence Northward on Locust Street to Ball Park, also Recreation Pier Line commencing at the intersection of Second Street North and Second Avenue North and extending Eastward on Second Avenue North to the intersection of Second Avenue North and Electric Dock Line commencing at the intersection of Beach Drive and western boundary line of Water lot No. 4 according to revised map of the City of St. Petersburg, and thence extending eastward over water lot No. 4 and the electric dock constructed thereon to the eastern end of said dock; also Nintenth and Central Avenue Line com-

mencing at the intersection of Central Avenue and Sixteenth Street and thence extending Northward on Sixteenth Street to car barn and lighting plant.

Also the following real estate in Pinellas County, Florida, to-wit: The north one hundred and fifty feet of water lot number four (4) according to revised map or plat of the City of St. Petersburg, as the same is recorded in the office of the Clerk of the Circuit Court of Hillsborough County, together with the riparian properties and rights adjacent and connected with said lot on Tampa Bay, together with warehouse and waiting room.

Also Water Lot No. 1, being a part of or an addition to the revised map of Golf Course and Jungle Subdivision filed for record on December 1, 1916, in plat Book No. 4, page 48, public records of Pinellas County, Florida, upon which is constructed what is known as Jungle Dock.

Also water lot number five (5) of Boca Ceiga Park Subdivision, being the whole of the government lot number two (2) and land adjacent, all in Section 33, Township 31 South, Range 16 East, in the town of Gulfport, Florida, known as Gulfport Dock (the said Railway Company not yet having acquired complete title to said Gulfport Dock and being in possession thereof under contract), together with casino building at Gulfport, Florida.

All that certain tract of land beginning at a point 660.4 feet south and 35 feet east from the Northwest corner of the southwest quarter of the north-east quarter of Section 24, Township 31 south, Range 16 east and run east 150 feet to a point; thence turn 39 degrees 37 minutes to the left and run 87.9 feet to a point; thence turn 88 degrees 38 minutes to the left and run 59.75 feet to a point; thence turn 55 degrees 10 minutes to the right and along the inside edge of a concrete retaining wall 46.82 feet to a point; thence turn 1 degree 8 minutes to the left and run along the inside edge of said wall 72.7 feet to a point; thence turn 24 degrees 8 minutes to the left and run along the inside edge of said wall 27.4 feet to the intersection of the east line of Sixteenth Street, thence turn 121 degrees 39 minutes to the left and run South along the east line of Sixteenth Street 203.5 feet to point of beginning; known as car barn property, together with the car barn and cement pier.

Also all line department, track, department tools all car barn materials and equipment, all tools on hand at car barn; also fourteen armature cores; also one pair New Bedford Scales and two trucks; also one Hupmobile and one Flanders automobile; one office furniture and fixtures, one electric driven Burroughs Adding Machine; all of the above-said personal property being more particularly and in detail described in the Receiver's Inventory thereof now on file with the Deputy Clerk of the said Court at Tampa, Florida, and on file with Charles M. Allen, Receiver, at St. Petersburg, Florida, to which Inventory reference may be had by intending purchasers.

Together with all licenses, patents, patent rights, processes heretofore owned by said St. Petersburg & Gulf Railway Company on May 3, 1918, at the time the Receiver of said property was appointed, and also all corporate, municipal and other franchises, rights, easements and immunities which the said Railway Company or Charles M. Allen, its Trustee, enjoyed on the 3rd day of May 1918, in connection with the above-said property; Also all property real and personal, of every nature and kind whatsoever which the said St. Petersburg & Gulf Railway Company owned at the date of the said Decree of Trust, to-wit, August 1, 1915, or which it has since acquired; together with all and singular the appurtenances thereto in anywise affecting or in anywise appertaining; also the reversion and remainders, property, claim and demand whatsoever, as well as law as in equity, of, in and to any part of the above-said property.

That said property is being sold by authority of said Trust Decree and of said Decree to satisfy taxes and other governmental liens outstanding against said property, such Receiver's Certificate as may have been authorized by said Court, costs and expenses of sale, including a reasonable attorney's fee for the undersigned, and to satisfy \$250,000.00 in bonds outstanding under said Decree of Trust.

That the successful bidder at said sale will be required to deposit with the undersigned the sum of \$15,000.00 in the form of a certified check, or otherwise, as indemnity against his said bid, in the event that the same should be confirmed by the Court and not made good after such confirmation; that upon such sale being made the undersigned will duly report the same to the Court, and upon such sale being confirmed by said Court, the undersigned as Trustees, will execute good and sufficient deed or deeds to the purchaser or purchasers of the said property.

THE PENNSYLVANIA COMPANY FOR
INSURANCE ON LIVES AND
GRANTING ANNUITIES

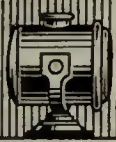
By J. A. GATES, Vice-President

EDWARD V. PRICHARD, Trustee

KNIGHT, THOMPSON & TURNER
of Tampa, Florida.

PRICHARD, SAUL, BAYARD & EVANS
of Philadelphia, Pa.

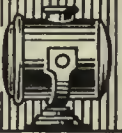
Solicitors for said Trustees.



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POWER PLANT

Comprising two Cooper-Corliss engines, 90-r.p.m., direct connected to 500-kw. Westinghouse Generators.

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Pittsburgh, Pa.

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Have 225 new cells A-10 Edison Nickel Steel Batteries. In fine condition. Never used. 1 8/10 volts per cell for heavy continuous work. Cannot break them down on overload. Fine for railway signaling work. electric light storage. Any purpose where reliable batteries are needed. *Will sell for less than half of cost price.* Write quick. Next to largest size made.

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3—13 Bench Laconia.
3—15 Bench Wason.

*Excellent Condition.
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FS—206, Electric Railway Journal
10th Ave., at 36th St., New York

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MOTOR GENERATOR SET

25 to 60-cycle, or frequency changer, 25-cycle, 3-phase, 2300 V. on each side. Capacity 300, 500, or even 750 K.W. Shipment wanted at once.

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Att. of James E. Hewes, Gen. Mgr.
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WANTED

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One Thousand (1000) kw., 6-phase, 60-cycle, 600-volt.

Also Three (3) 400-kv.-a.

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1-phase, 60-cycle, primary voltage 13,000.

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POSITIONS VACANT

ARMATURE winder and electrician, familiar with general maintenance and capable taking care of rolling stock; small road; 12 cars; give experience and salary. Married man preferred. P-198, Elec. Ry. Journal, Chicago.

DRAFTSMAN, experienced on electrical power plant or sub-station work. Good future for men of ability. New York & Queens Electric Light & Power Co., 444 Jackson Ave., Long Island City, New York.

GRADUATE electrical engineer wanted. Competent to design, construct and operate transmission lines up to 66,000 volts, general power and railway distribution including bonding, electrolysis and electric signals. Also to act in a consulting capacity in reference to all electrical matters pertaining to power houses, substations, car equipments and all other electrical matters in connection with a large electric railway and power system. Address, giving nationality, age, experience, salary wanted and references. General Manager, The Shore Line Electric Railway Company, 362 Main St., Norwich, Conn.

MASTER mechanic wanted who understands maintenance GE equipment and who can handle men; good salary. P-207, Elec. Ry. Journal, Philadelphia.

STATION wiremen and helpers wanted for central and sub-station construction by large eastern power company. Permanent position and good wages. State experience and draft classification. P-215.

STOREKEEPERS wanted also clerk in managers office. Mobile Light and R.R. Co.

POSITIONS WANTED

MASTER mechanic now employed wants to make a change. Can put down equipment in high grade operating condition. PW-216.

POSITIONS WANTED

CLAIM agent, regarded as one of the oldest and most successful, one of the leading experts in accident prevention and high class transportation man, desires change. Particularly desirous of becoming attached to a property in which the accident expense is regarded as unreasonably high. Would undertake to bring about substantial reduction and can do so within a reasonably short time. Highest references. PW-217, Elec. Ry. Journal.

CONTROLLER man or wireman desires to make change; can do some armature winding; four years' experience as general shop foreman; good references. PW-210, Elec. Ry. Journal.

EXECUTIVE will be open for position Sept. 1; 12 years' executive and operating experience in all departments of city and interurban electric railways; full particulars upon request. PW-213, Elec. Ry. Journal, Chicago.

MASTER mechanic desires position on medium sized road; can put run down equipment in high grade operating condition. PW-202, Elec. Ry. Journal, Cleveland.

SUPERINTENDENT of Employment and Inspection wants position; up-to-date methods including instruction of trainmen and all operating problems. Address H. Van Buskirk, 60 Wall St., N. Y.

YOUNG married man, expert on railway motor and controller repairs, desires position offering chance for advancement; state salary; can report in 40 days. PW-214, Elec. Ry. Journal.

SUPERINTENDENT OF CONSTRUCTION

seeks opportunity to make change for satisfactory reasons. Thoroughly experienced in track, power house and car barn construction, etc. Reference.

PW 203—Elec. Ry. Journal.
Leader-News Bldg., Cleveland, O.

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with
Names of Manufacturers and Distributors Advertising in This Issue

Advertising, Street Car.
Collier, Inc., Barron G.

Alloys Steel & Iron. (See also
Bearings & Bearing Metals
Titanium Alloy Mfg. Co.

Air Rectifiers
Holden & White, Inc.

Anchors, Guy.
Electric Service Supplies Co.
Holden & White, Inc.
Johns-Manville Co., H. W.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

Automobiles and Buses.
Brill Co., The J. G.

Axle Straighteners.
Columbia M. W. & M. I. Co.

Axles, Car Wheel.
Bemis Car Truck Co.
Brill Co., The J. G.
Carnegie Steel Co.
National Railway Appliance Co.
St. Louis Car Co.
Standard Steel Works Co.
Westinghouse Elec. & M. Co.

Babbitting Devices.
Columbia M. W. & M. I. Co.

Badges and Buttons.
Electric Service Supplies Co.
International Register Co., The

Batteries, Dry.
Johns-Manville Co., H. W.
Nichols-Linters Co.

Batteries, Storage.
Electric Storage Battery Co.

Bearings and Bearing Metals.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
More-Jones Brass & Metal Co.
St. Louis Car Co.
Westinghouse Elec. & M. Co.

Bearings, Center and Roller Slide.
Holden & White, Inc.

Bearings, Roller and Ball.
Gurney Ball-Bearing Co.
SKF Ball Bearing Co.

Bells and Gongs.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
St. Louis Car Co.

Benders, Rail.
Niles-Bement-Pond Co.
Zelnicker, Walter A., Supply Co., Inc.

Bollers.
Babcock & Wilcox Co.

Boiler Cleaning Compounds.
Johns-Manville Co., H. W.

Boiler Coverings.
Johns-Manville Co., H. W.

Boiler Tubes.
National Tube Co.

Bond Trailers.
American Steel & Wire Co.

Bonding Apparatus.
American Steel & Wire Co.
Electric Railway Improvement Co.
Electric Service Supplies Co.
Imperial Brass Mfg. Co.
Ohio Brass Co.

Bonds, Rail.

American Steel & Wire Co.
Electric Railway Improvement Co.
Electric Service Supplies Co.

General Electric Co.
Johns-Manville Co., H. W.
Lincoln Bonding Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

Book Publishers
McGraw-Hill Book Co., Inc.

Boring Tools, Car Wheel.
Niles-Bement-Pond Co.

Braces, Rail.
Kilby Frog & Switch Co.

Brackets and Cross Arms. (See
also Poles, Ties, Posts, Etc.)
American Bridge Co.
Hubbard & Co.
Linsley Bros. Co.
Ohio Brass Co.

Brake Adjusters.
Holden & White, Inc.
Westinghouse Traction Brake Co.

Brake Shoes.
Amer. Brake Shoe & Fdry. Co.
Barbour-Stockwell Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

Brakes, Brake Systems and Brake Parts.

Allis-Chalmers Mfg. Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
General Electric Co.
Holden & White, Inc.
National Brake Co.
St. Louis Car Co.
Westinghouse Trac. B. Co.

Bridges and Buildings
American Bridge Co.

Brooms, Track, Steel or Rattan.
Zelnicker, Walter A., Supply Co., Inc.

Brush Holders.
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eureka Co.

Brushes, Carbon.
General Electric Co.
Jeandron, W. J.
Morgan Crucible Co.
National Carbon Co., Inc.
United States Graphite Co.
Westinghouse Elec. & M. Co.

Brushes, Graphite.
United States Graphite Co.

Bunkers, Coal
American Bridge Co.

Bushings, Case Hardened & Manganese
Bemis Car Truck Co.

Cables. (See Wires and Cables.)
Carbon Brushes. (See Brushes, Carbon.)

Car Equipment. (For Penders, Heaters, Registers, Wheels, etc.—See those headings.)

Car Trimmings. (For Curtains, Registers, Doors, Seats, etc.—See those headings.)

Cars, Passenger, Freight, Express, etc.

American Car Co.
Brill Co., The J. G.
Kuhlman Car Co., G. C.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.
Wason Mfg. Co.

Cars, Second Hand.
Electric Equipment Co.

Cars, Self-Propelled.

Electric Storage Battery Co.
General Electric Co.

Castings, Brass, Composition or Copper.
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eureka Co.
More-Jones Brass & Metal Co.

Castings, Gray Iron and Steel.
American Bridge Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Horne Mfg. Co.
St. Louis Car Co.
Standard Steel Works Co.
Union Spring & Mfg. Co.

Castings, Malleable and Brass.
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Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

Catchers and Retrievers, Trolley.
Electric Service Supplies Co.
Holden & White, Inc.
Ohio Brass Co.
Wood Co., Chas. N.

Celling, Car.—(See Head Lining.)

Circuit Breakers.
Automatic Reclosing Circuit Breaker Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Clamps and Connectors for Wires and Cables.
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

Cleaners and Scrapers Track.—(See also Snow-Plows, Sweepers and Brooms.)
Brill Co., The J. G.
Ohio Brass Co.

Clinsters and Sockets.
General Electric Co.

Coal and Ash Handling.—(See Conveying and Hoisting Machinery.)

Coal Crushers
Williams Patent Crusher & Pulverizer Co.

Coil Banding and Winding Machines.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

Colls, Armature and Field.
Cleveland Armature Works.
Columbia M. W. & M. I. Co.
D & W Fuses Co.
General Electric Co.
Independent Lamp & Wire Co.
Westinghouse Elec. & M. Co.

Colls, Choke and Kieklag.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Coin-Counting Machines.
International Register Co., The

Commutator Motors.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.
Wood Co., Chas. N.

Commutator Truing Devices.
General Electric Co.

Commutators or Parts.
Cleveland Armature Works.
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Compressors, Air.

Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Trac. B. Co.

Condensers
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Conduits, Underground.
Johns-Manville Co., H. W.

Connectors, Solderless.
Westinghouse Elec. & Mfg. Co.

Controller Regulators.
Electric Service Supplies Co.

Controllers or Parts.
Allis-Chalmers Mfg. Co.
Columbia M. W. & M. I. Co.
General Electric Co.
Johns-Manville Co., H. W.
Westinghouse Elec. & Mfg. Co.

Controllog Systems.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Converters, Rotary.
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Conveying and Hoisting Machinery.
American Bridge Co.
Columbia M. W. & M. I. Co.
Green Engrg. Co.

Cord, Bell, Trolley, Register, etc.
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The
Samson Cordage Works

Cord Connectors and Couplers.
Electric Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.

Couplers, Car.
Brill Co., The J. G.
Ohio Brass Co.
Van Dorn Coupler Co.
Westinghouse Trac. B. Co.

Cranes. (See also Hoists.)
Allis-Chalmers Mfg. Co.
Niles-Bement-Pond Co.

Crossotting. (See Wood Preservation.)

Cross Arms. (See Brackets.)

Crossing Foundations.
International Steel Tie Co.

Crossing Signals. (See Signals, Crossing.)

Crossings, Track. (See Track, Special Work.)

Crushers, Rock
Allis-Chalmers Mfg. Co.

Culverts
Canton Culvert & Silo Co.

Curtains and Curtain Fixtures.
Brill Co., The J. G.
Electric Service Supplies Co.
St. Louis Car Co.

Cutting Apparatus, Oxy-Acetylene.
Imperial Brass Mfg. Co.
Milburn Co., The Alex.

Derailing Devices. (See also Track Work.)
Cleveland Frog & Crossing Co.
Reading Specialties Co.

Destination Signs.
Columbia M. W. & M. I. Co.
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Defective Service.
Witch Service, F. Edward



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General Electric Co.
Hale & Kilburn Corp.

Doors, Folding Vestibule.
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Drills, Track.
American Steel & Wire Co.
Electric Service Supplies Co.
Niles-Bement-Pond Co.
Ohio Brass Co.

Dryers, Sand.
Electric Service Supplies Co.
Zelnicker, Walter A., Supply Co., Inc.

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Arnold Co., The.
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Bylesby & Co., Inc., H. M.
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National Railway Appliance Co.

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American Steel & Wire Co.
Page Steel & Wire Co.
Standard Steel Mould Co.

Fenders and Wheel Guards.
Brill Co., The J. G.
Consolidated Car Fender Co.
Electric Service Supplies Co.
Star Brass Works.

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Johns-Manville Co., H. W.
Westinghouse Elec. & Mfg. Co.

Field Cols (See Cols.)

Filters, Water.
Scalis & Sons Co., Wm. B.

Fire Extinguishing Apparatus.
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Flooring Composition.
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Johns-Manville Co., H. W.

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Standard Steel Works Co.

Frogs, Track. (See Track Work.)

Furoaces. (See Stokers.)

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Columbia M. W. & M. I. Co.
D & W Fuse Co.
General Electric Co.
Johns-Manville Co., H. W.
Westinghouse Elec. & Mfg. Co.

Fuses, Refillable.
Columbia M. W. & M. I. Co.
General Electric Co.

Gaskets.
Johns-Manville Co., H. W.
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Westinghouse Traction Brake Co.

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Westinghouse Elec. & Mfg. Co.

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Ohio Brass Co.

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Columbia M. W. & M. I. Co.
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Nuttall Co., R. D.
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Gongs. (See Bells and Gongs.)

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Greases. (See Lubricants.)

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Grinding Blocks and Wheels
Railway Track-work Co.

Guards, Cattle.
American Bridge Co.

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Harps, Trolley.
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
More-Jones B. & M. Co.
Nuttall Co., R. D.
Star Brass Works.

Headlights.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
St. Louis Car Co.

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Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
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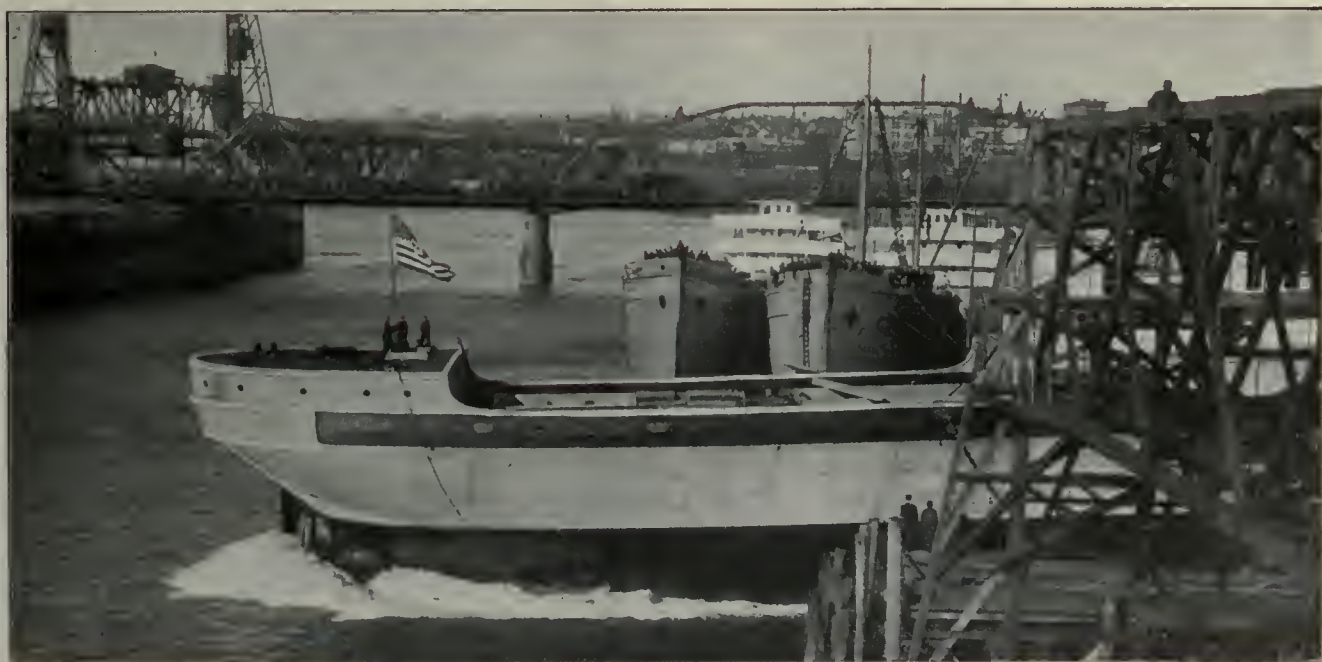
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Specify Titanium-Treated Rail for DURABILITY—



A battleship with blow-holes in its armor is not very dependable; nor a rail in which structure-weakening and life-shortening impurities have been allowed to remain.

The dependability—and consequently the durability—of Titanium-Treated rail is due to the fact that the metal is so thoroughly cleansed of all harmful elements that the finished rail is a uniform product of longer life and greater safety

The low cost of

TITANIUM TREATMENT

\$2.00 per ton, compared with the cost of rail,
makes its use for any important service obvious.

TITANIUM ALLOY MANUFACTURING COMPANY

Operating Under Rossi Patents

General Office and Works:
Niagara Falls, N. Y.



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Processes and Products Patented

Pittsburgh Office: Oliver Building
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AGENTS:

Pacific Coast: ECCLES & SMITH CO., Los Angeles, San Francisco, Portland
Great Britain and Europe: T. ROWLANDS & CO., Sheffield, England



52% Power Saving

At Columbus, Ga., the old 30,000-lb. cars used to take 2.1 to 2.3 Kw. hours per car mile.

The Birney Safety Cars, weighing 6 tons and operating at higher speed plus air brakes and other power using devices take but 1 Kw. hour. This means that the new cars require less than 48% of the power required by the old cars, a power saving of 52%. Not only the light weight of this car, but also the use of Gurney Ball Bearings in motors and main journals, had an important part in making this saving possible.

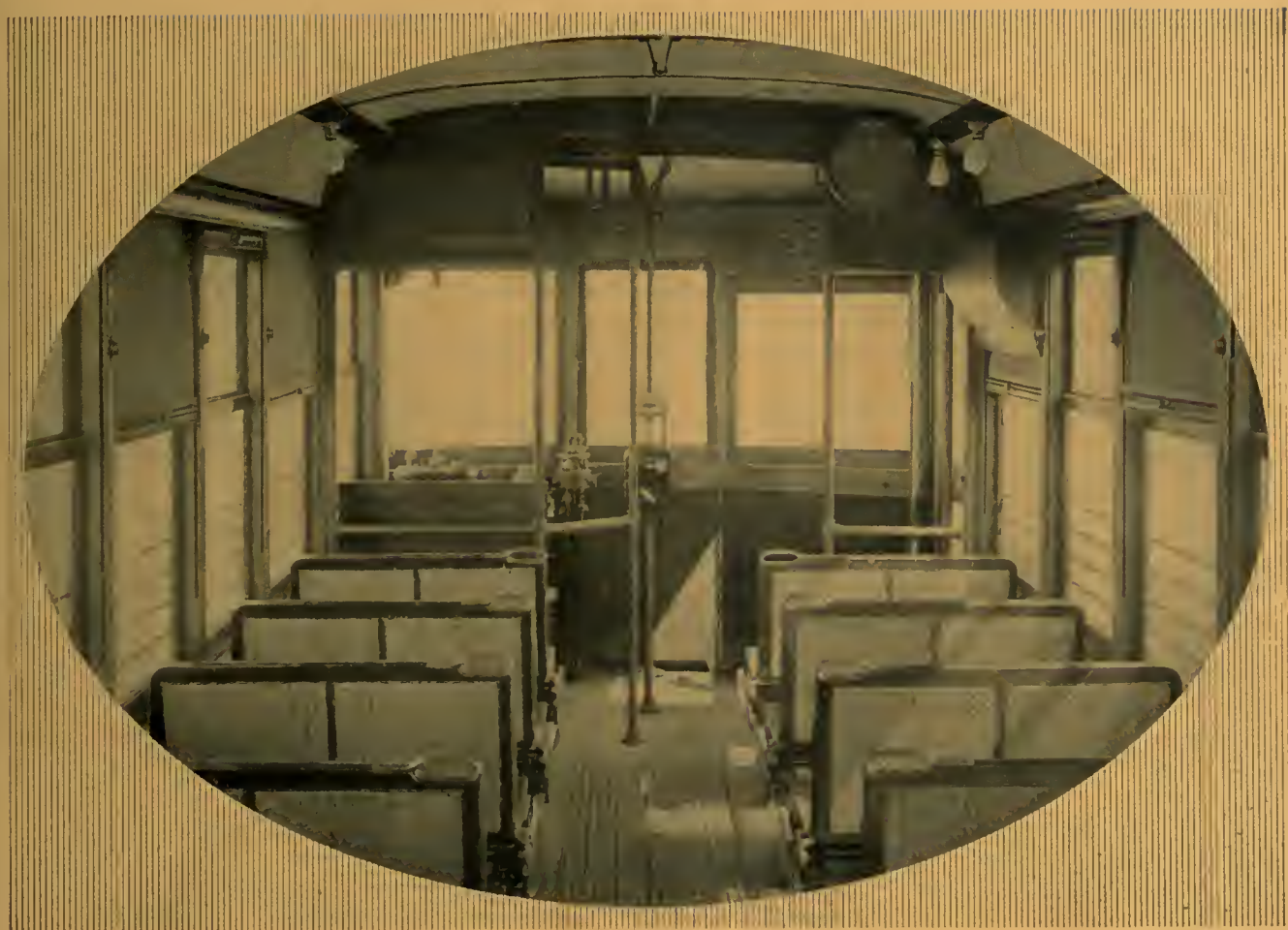
Gurney Ball Bearing Co.

Conrad Patent Licensee

301

Jamestown, New York

GURNEY



Safety Cars for Large Cities

THE latest of the large city railway systems to order Birney Safety Cars is that of Los Angeles. Twenty Safety Cars will soon be running on the streets of this great metropolis of the southwestern quarter of the United States, and five each in San José, Fresno and Stockton, all ordered by the Southern Pacific Company. The Los Angeles order is additional evidence that big cities as well as small need light-weight, one-man cars to induce more riding, compete with automobiles and

profitably handle expanding traffic. Heavier equipment than necessary and unnecessary platform expense are handicapping many companies in these days of high costs. Compare the total weight of a 36-passenger Safety Car and its truck, fully equipped for operation, of only 12,400 lb., with your heavy double-truck cars and figure the reduction in platform expense and you will probably find that it would be a paying proposition to start equipping with Safety Cars at once even if the double-truck cars have to stand unsold.

J. G. BRILL COMPANY
PHILADELPHIA, PA.

G. C. KUHLMAN CAR CO.
CLEVELAND, OHIO



AMERICAN CAR COMPANY
ST. LOUIS, MO.

WASON MANUFACTURING CO.
SPRINGFIELD, MASS.

THE illustration shows one of the two 30,000 kw. Curtis turbines installed in the joint power station of the American Gas & Electric Co., and West Penn. Power Co., at Windsor, W. Va.; four additional turbine units of the same capacity are on order.

This station, at the mouth of the coal mine, transmits power to consumers in West Virginia, Ohio and Western Pennsylvania, including the West Penn. Railway. Where economy and reliability are essential, Curtis turbines predominate.



General Electric Company

General Offices:



Sales Offices

ELECTRIC RAILWAY JOURNAL

August 3, 1918



SKF

To eliminate lubrication troubles and lengthen the life
— of driving gears, Newport-Kentucky, can have
Westinghouse No. 300 Motors equipped with SKF
Ball Bearings—at the same or other modern systems.

— Your Service Department will furnish data.



“Let the People Know”

“DELIVERING merchandise with motor trucks is mighty popular with the people,” remarked the President to the General Manager, “and it should be. Auto trucks are a great convenience, and have been a wonderful aid to our country in time of need.

“It is astonishing, however, how little thought the public has given to Electric Freight Haulage.”

“Well, I think we are largely to blame,” said the General Manager. “We did not let the people know about the service the electric railways were able to render in handling freight within their territory. The restrictions and burdens imposed upon us have been so great that we have not had the heart to expend any money advertising our proposition to the public, like the auto truck people are doing. Consequently, the auto truck has been the only method most people considered, when they wanted goods delivered promptly. No one gave any thought about the increased cost of maintaining the highways, because that cost comes out of the state and county taxes.”

“I am satisfied,” said the President, “that we have been neglectful on the freight haulage question. We should take steps, at once, to let all the people, reached by our system, know the kind of quick service we can render. We owe it to them to advertise our facilities in the daily and weekly press, and with cards in our cars. The electric roads mean so much to the welfare of all of us, that the public should be educated to give serious thought to the subject.

I have just read, with great interest, the publications the Westinghouse Electric people got out recently on electric railway freight haulage in relieving freight congestion. The auto-truck has come to stay. It has a big field of usefulness, but should not be used where electric lines serve the people better.”

Westinghouse Electric

East Pittsburgh



& Manufacturing Co.

Pennsylvania

Electric Railway Journal

H. W. BLAKE, *Editor*

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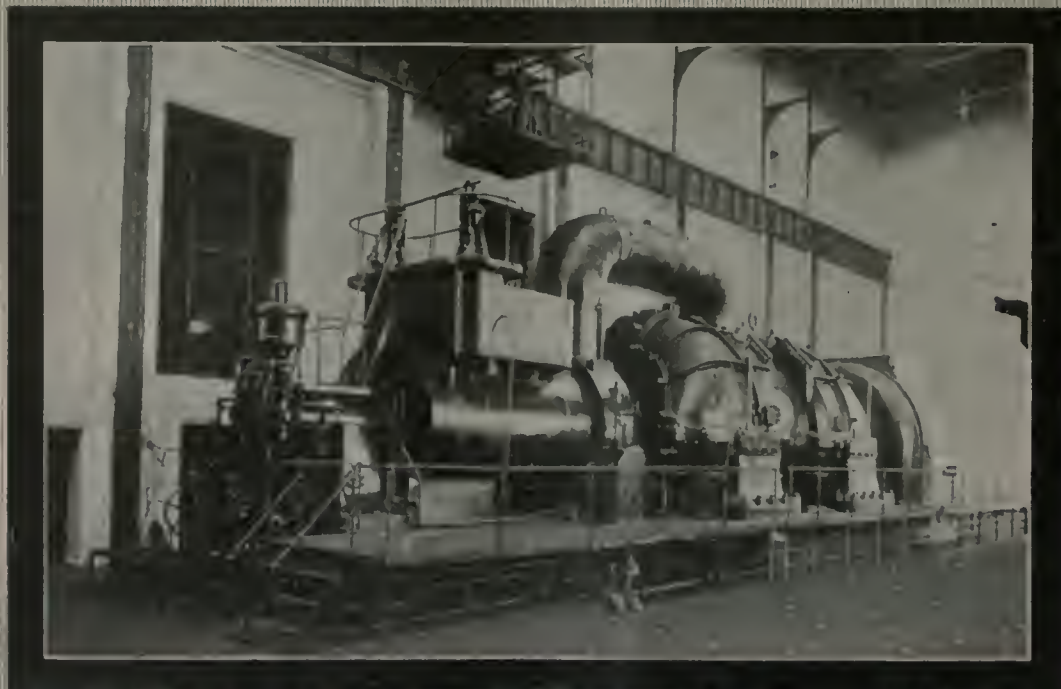
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Westinghouse Turbine Generator



Westinghouse Steam
Turbine Generators are
built in capacities up to 70,000
kilowatts.

They are unsurpassed in depend-
ability and economical operation.

**Westinghouse Electric &
Manufacturing Co.**

East Pittsburgh, Pa.



109

Air Brakes for Every Service



We supply air brakes for all kinds of electric railway cars from the light weight, "SAFETY" car to those in heavy, multiple-unit train service.

We recommend semi-automatic schedules for single city cars, with and without occasional trailers;

automatic brakes for trains of two or three cars in city, suburban and interurban service; and universal variable-load brake, electrically controlled, for elevated and subway trains.

Train on the New York Municipal Railway. Car weight, 87,000 lbs. Electro-Pneumatic, Variable Load Brake.



Westinghouse Traction Brake Company

General Offices and Works, Wilmerding, Pa.

Atlanta, Ga.
Boston, Mass.
Chicago, Ill.
Columbus, O.

Denver, Col.
Houston, Tex.
Los Angeles, Cal.



Mexico City
New York, N. Y.
Pittsburgh, Pa.

San Francisco
Seattle, Wash.
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St. Paul, Minn.

Brake Building our Business for a Lifetime



Tampa Electric Co., Tampa, Florida

The Safety Car is the Standard Car in many American Cities

FROM COAST TO COAST, MEXICO AND CANADA, the Safety Car is being installed, because it answers the question "How to give better service at less cost?"

One company bought 154 Safety Cars in sixty days.

The Safety Car Method of operation insures:

Greater Safety

Higher Schedule Speed

Reduced Headway

More Car Service

Decreased Operating Expense

Decreased Platform Expense

Smaller Power Consumption

These, of course, mean increased revenue.



Seattle, Wash.

Experience in many cities shows that the operation of Safety Cars resulted, in addition to handsome savings in operating cost, in greatly increased revenues, because of the most satisfactory service.

THE PERFECTION OF THE "METHOD" OF SAFETY CAR OPERATION IS A CONSEQUENT DEVELOPMENT OF THE AIR BRAKE AND SAFETY CAR CONTROL

EQUIPMENT. Every practical railway man should be interested in the advantages of our devices. Write for information on this equipment.

SAFETY CAR DEVICES COMPANY

Main office:

**Boatmen's Bank Building
ST. LOUIS**

CHICAGO
Ry. Exch. Bldg.

NEW YORK
City Invest. Bldg.

PITTSBURGH
Westinghouse Bldg.

CANADA—Canadian Westinghouse Co., Ltd.,
Hamilton Ont.



El Paso Electric Ry. Co., El Paso, Texas



PRODUCTS

Quality First



Prove The O-B Retriever—At Our Expense

There is one sure way for you to find out just what the O-B Retriever will mean to you. Try it at our expense on your own cars.

Then you can see how it always works—how it successfully stands battering service—how rugged its parts are—how free from trouble it is.

Let us send you an O-B Retriever for 60 days' free trial. At the end of that period you may return it or buy it as you wish. Write today.

THE OHIO BRASS COMPANY, Mansfield, Ohio

New York

Philadelphia

Pittsburgh

Chicago

San Francisco

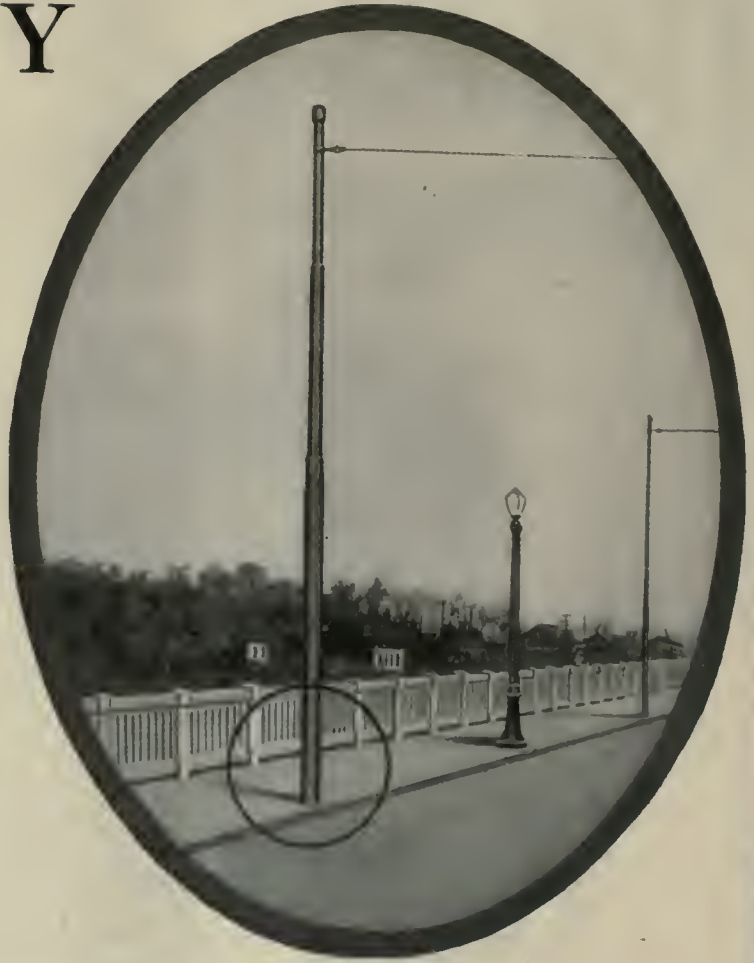
Los Angeles

RIGIDITY

Under Any Wire Stress

The heaviest overhead wiring system will not have the slightest effect on the strength and rigidity of Elreco tubular poles of proper size, once they are properly set. These are the strongest, most durable poles for heavy duty—constructed to last for years.

Elreco poles combine the lowest cost, lightest weight, least maintenance and greatest adaptability. They offer you a permanent solution of your overhead maintenance troubles.



Elreco Tubular Poles Cannot Telescope

The illustration at the left shows our "Wire Lock" Swedge Joint which positively prevents telescoping. No matter how great a weight, stress or strain these poles are subjected to, they cannot telescope.

The chamfered joint is another important feature of Elreco poles. It keeps water and moisture out of the joints, preventing rust.

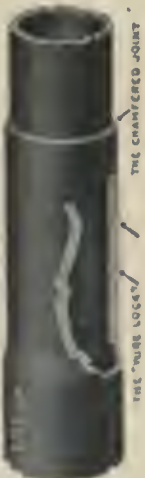
Send for Catalog

We will be glad to send catalogs and complete information about any of the Elreco products. Just tell us what equipment you need and we will quickly furnish details and prices.

Electric Railway Equipment Co.

Cincinnati, Ohio

New York: 30 Church Street



Concreting 1320 Ft. of Track Daily

INTERNATIONAL STEEL TWIN TIES

Make That Schedule Easy

200 cubic yards of concrete is being mixed and placed in 10 hours by a gang of twenty-five men on a number of street railway properties. With 800 cubic yards of concrete to the mile of steel twin tie track below the rail base, this gang will concrete completely 1320 ft. of track in 10 hours.

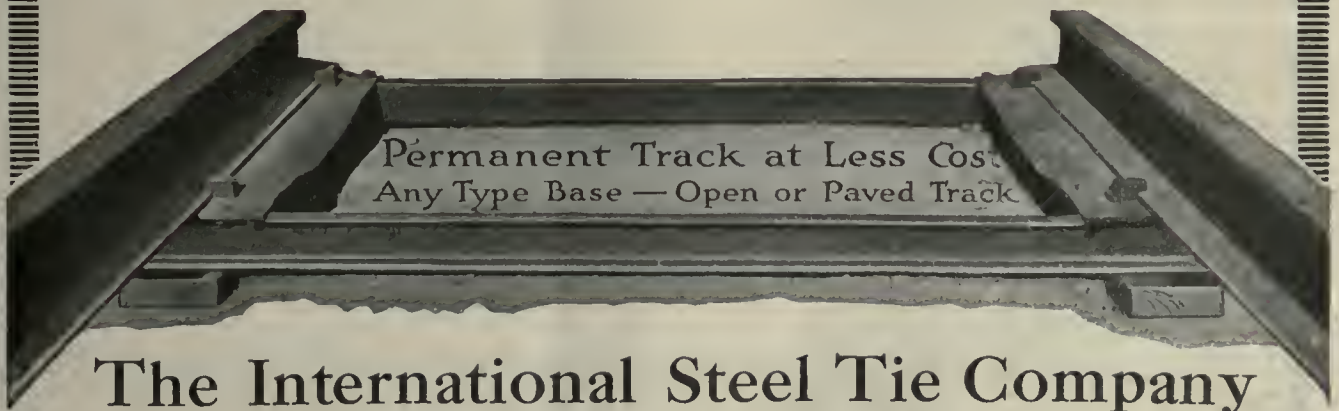
Steel twin ties in a seven-foot trench and with seven inches of concrete in bearing below the tie plate requires less than 800 cubic yards per mile of track. That's why you can speed up the job to 132 ft. of track per working hour. Less equipment and fewer men would not move so fast, but the ratio of progress would remain the same.

In addition, the excavation is reduced 50% and the number of ties to handle 66%. These also mean labor saving. And your track is out of service for a shorter period.

Ask the users of steel twin ties if you want to check these facts.

A stock of low-priced steel in hand insures a "rock bottom" price and prompt delivery. Order now and you'll be a regular user next year.

Prompt deliveries made from stock.



Permanent Track at Less Cost
Any Type Base — Open or Paved Track

The International Steel Tie Company

Manufacturers of Steel Twin Ties and Crossing Foundations

General Sales Office and Works: Cleveland, Ohio

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Los Angeles, Cal.

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Minneapolis, Minn.



SCENES ON THE
OAKLAND, ANTIOCH
& EASTERN RY.



Oakland—Sacramento

86 MILES—SINGLE TRACK

209 SIGNALS

Entire territory protected by UNION Color Light Signals controlled by continuous A.C. track circuits.

Operation and maintenance cost *per signal* for the year 1917, including power, inspection, lamp renewals, etc., \$16.52.

Total signal indications for the year 1917, 3,240,000.

UNION SIGNALS facilitate traffic and also represent low insurance premiums on life and property protected.

Union Switch & Signal Co.

Founded by Geo. Westinghouse, 1881.

SWISSVALE, PA.



Hudson Terminal Bldg.
NEW YORK

McGill Building
MONTREAL

Candler Bldg.
ATLANTA

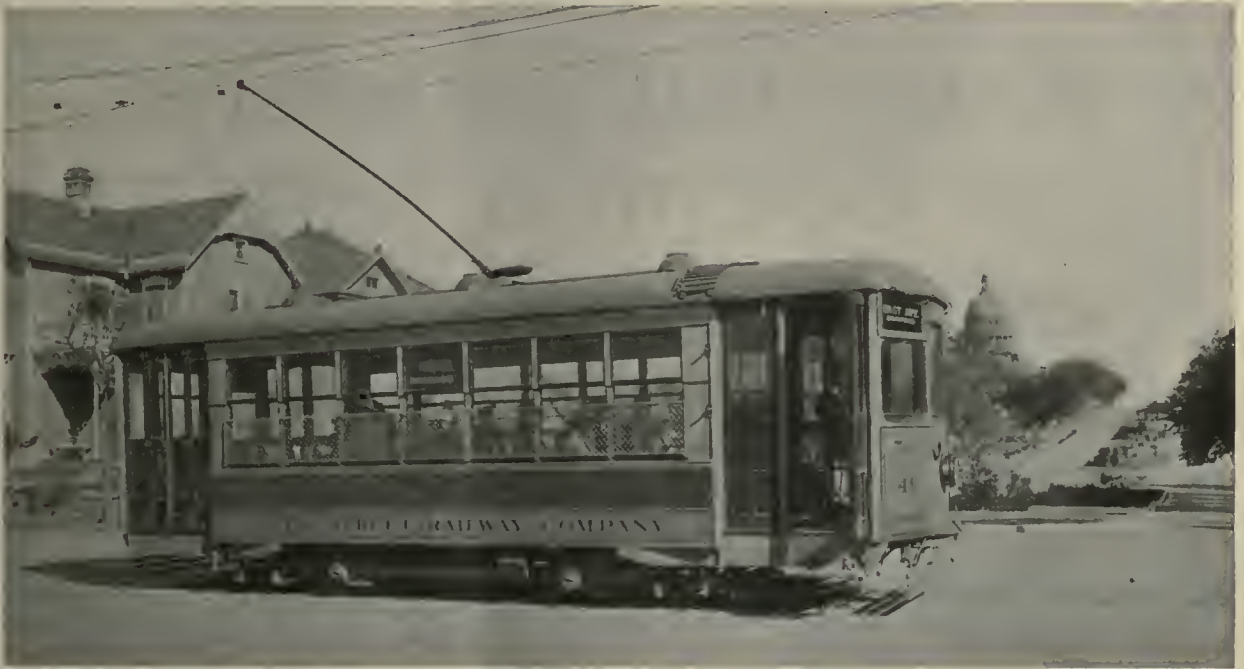
Railway Exchange Bldg.
ST. LOUIS MO.

Peoples Gas Bldg.
CHICAGO

So. Pacific Bldg.
SAN FRANCISCO



Represented by the GENERAL ELECTRIC CO. in Australia, South Africa and Argentina



Do As Austin Has Done

Capital of the Lone Star State
Another ESSCO Better Service Town

The Austin Street Railway was one of the first to see the many merits of the Light-Weight Safety Car.

In planning to provide this improvement for its patrons, the company gave careful thought to the specialties for the car as well as to the type of car.

And this was its decision:

"Golden Glow" Incandescent Headlights
Faraday High Voltage Car Signals
Keystone Trolley Catchers
Keystone Rotary Gongs
Keystone Air Sanders
International Registers

ELECTRIC SERVICE SUPPLIES CO.

Manufacturer of Railway Material and Electrical Supplies

PHILADELPHIA
17th and Cambria Sts.

NEW YORK
50 Church St.

CHICAGO
Monadnock Bldg.

Canadian Distributors: Lyman Tube & Supply Co., Montreal, Toronto, Winnipeg.

Every Car in Omaha is Equipped With Anderson Slack Adjusters

In Service for 8 Years

On the Omaha & Council Bluffs Street Railway, Anderson automatic brake slack adjusters have stood the best possible test—that of long-time service. For 8 years they have been guardians of Omaha's brakes and there has never been any question of their dependability.

Care of brakes costs the Omaha company little money and little labor, for every car is equipped with Anderson adjusters. Consequently, brake setting is eliminated from nightly inspection costs and the only attention necessary, except for watchfulness over pins, cotters, etc., is when new shoes are needed.

Anderson adjusters reduce brake shoe wear, accompanied by less wheel wear, less armature maintenance cost and less compressor use. They decrease time of cars out of service for bad order brakes and make all cars brake alike.

Notice this unretouched photograph of an Anderson adjuster on a Brill 27-G truck at Omaha. It is covered with dirt but that does not affect it. The thread where it unscrews out of the dead lever casting to lengthen the adjuster is clean. Mud, snow or ice do not prevent the successful operation of this device. Moreover, false slackness or worn truck parts do not interfere with its reliable performance.

*Send for further description
and our trial offer.*

How They Work

The Anderson adjuster consists essentially of 3 parts—a measuring means, an operating means, and an adjusting means. Fingers on a rocker arm measure the brake lever travel. As shoes wear and live lever travel increases, these fingers measure the amount of slack and thru the rocker arm actuate a friction clutch. This clutch, the operating means, turns and screws the main threaded shaft, increasing the length and thus taking up the slackness.

There is a hex nut on the shaft and to reset the adjuster for new shoes, turn the shaft with a wrench—a simple method.

These adjusters take the place of ordinary turnbuckles but the threaded shaft *does not wear out* as turnbuckles do because there are no lock or jam nuts to wear the threads. The adjusters require no attention. They can be put on almost any truck in 30 minutes.



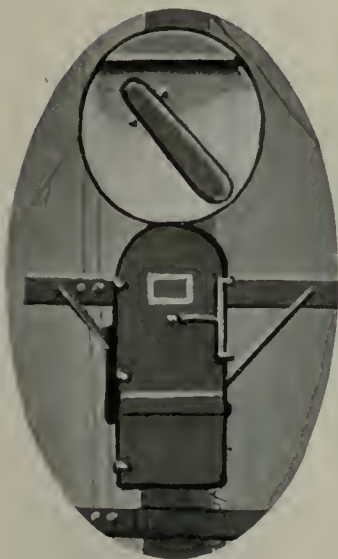
Holden & White Inc.

817 Fisher Building, Chicago, Ill.

National Railway Appliance Co., New York and Washington; C. E. A. Carr Co., Toronto; W. M. McClintock, St. Paul; Alfred Connor Denver; O. H. Davidson Equipment Co., Salt Lake City; F. F. Bodler, San Francisco; S. I. Wallis, Los Angeles.

"Go Ahead, the Block's Clear"

*Says Chapman.
Automatic Signal*



When the car approaches the signal and the semaphore is in a diagonal position, like this photograph taken on the Portland & Lewiston Interurban Ry. System, the block is clear. If, on passing the trolley contactor, the arm assumes a vertical position the car may proceed. Should the arm be vertical on reaching the signal it means a car is in the block going away from you, if horizontal a car is approaching.



CHAPMAN Automatic Signals are in use on many well-operated interurban electric roads because they have found this system highly efficient, perfectly reliable and very economical to maintain.

The red semaphore arm is 18 in. long and operates on a hooded white disk 24 in. in

diameter. This can be seen a long distance at any time of day or night in all weather.

When desired, hooded colored lights will be furnished.

For speeding up the movement of cars and reducing the liability of accidents you should investigate the Chapman System.

Write for Information

Charles N. Wood Company

14 Federal Street, Boston, Mass.

Phono-Electric in Bustling Houston



The installation of Phono-Electric Trolley Wire on portions of the main belt of the Houston (Texas) Electric Company is a characteristic way of introducing this long-lived, smooth-contact, trolley wire.

The railway naturally puts it up first where its "Make-Good" qualities will tell soonest in comparison with copper; and

where continuity of service counts more than on individual lines.

Many railways which began like Houston have since put up Phono-Electric Trolley Wire on the greater part of their mileage.

You can't lose by putting up some Phono-Electric over your heaviest lines. Thereafter you will sell yourself!

Bridgeport Brass Company
Bridgeport **Connecticut**

Northern White Cedar Poles

AT DETROIT, MICH.

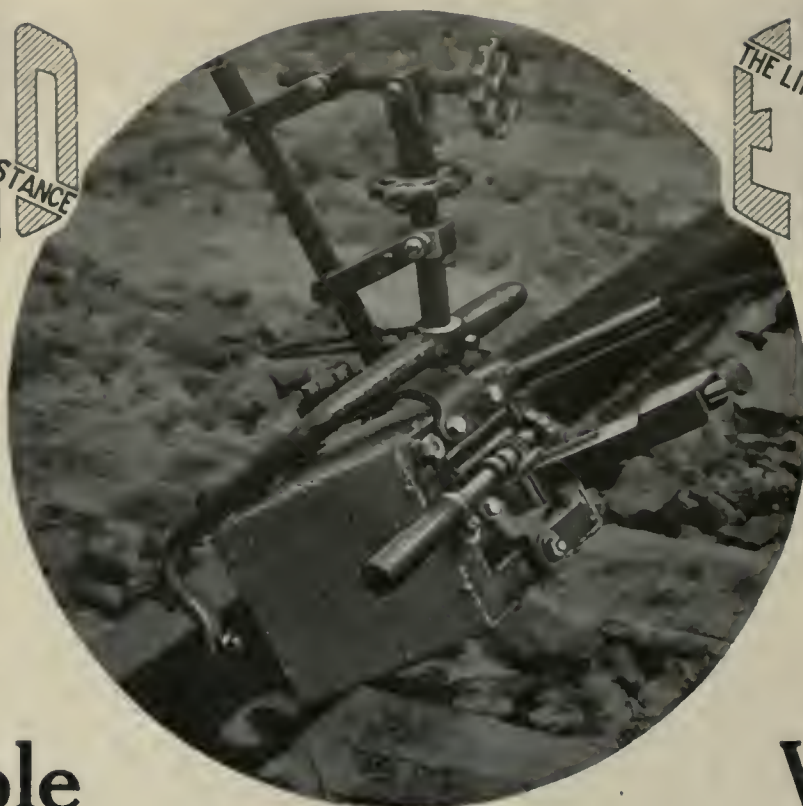
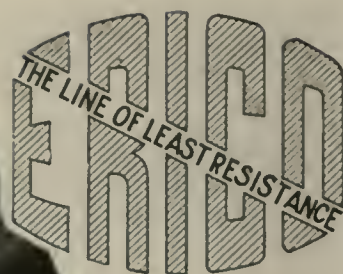


These lines, built of 50-foot *Northern White Cedar Poles*, are located at Woodward Ave. and Nine Mile Road, Detroit, Michigan. The poles were set 13 years ago. They carry:

- | | |
|--|--|
| 1 Ground Wire—No. 6 Copper | 2 Edison Private 'Phone Wires, No. 10 Copper |
| 3 Transmission Wires, No. 0 Copper | 36 Telephone Company Wires, No. 14 Copper |
| 3 Power Line Wires, No. 0 Copper | 2 Lighting Secondary Wires, No. 6 Copper |
| 2 Series Street Lighting Wires, No. 6 Copper | |

For the Sturdy, Attractive Line Use *Northern White Cedar Poles*.

Northern White Cedar Association, Lumber Exchange, Minneapolis, Minn.



Portable

Welder

Welds 20 to 30 Rail Bonds per Hour

The Erico Portable Welder is a light weight, efficient bond welding machine, operated directly from the trolley wire, in conjunction with a rheostat, on any voltage from 110 to 750.

With it, one bonder and two helpers can readily install from 20 to 30 bonds per hour. It effects a perfect union between bond terminal and rail, with no flame or arc striking either part, thus preventing any chance of damage to operator, bond or rail.

The welder portion of the outfit, shown above, weighs only 65 pounds. It can easily be removed from the track—by one man—and so does not interfere with traffic.

Write for full information and prices.

The Electric Railway Improvement Co.

Cleveland, Ohio

You should know these facts about Armco Welding Rods

Better welding rods than ARMCO never were made and are NOT going to be—simply because the highest grades of (so called) Norway and Swedish Iron are no more uniform than ARMCO Iron.



The trade mark ARMCO carries the assurance that iron bearing that mark is manufactured by the American Rolling Mill Company with the skill, intelligence and fidelity associated with its products, and hence can be depended upon to possess in the highest degree the merit claimed for it.

Before putting ARMCO Rods on the market the metallurgists and specialists of the American Rolling Mill Company concentrated years of profound study upon welding requirements. Together at the furnace, at the microscope, in actual applications, and in ways that had never been attempted before, these engineers developed a metal peculiarly free from slag, sulphur, oxides, phosphorous and other impurities harmful to a uniformly strong efficient weld. Further, under their able direction this filling material has been standardized in two grades, one for oxy-acetylene and another for electric welding, both of which do well, what has heretofore required a choice of one from many grades.

ARMCO Rods are therefore the logical material for successful welders who seek to protect alike their own reputations and their customers' or employers' best interests.

ARMCO Rods stand the tests of the man who must be shown, and to those who can grasp the opportunities of an expanded welding field, will be found one of the best investments that any welding shop can make.

If you want to know just what ARMCO Rods will do under specific conditions, and where ARMCO Rods are meeting like requirements with absolute satisfaction, tell us about your present methods. Our engineers will gladly advise you if improvement is possible and to what extent.

PAGE STEEL & WIRE CO.

Established 1883 as Page Woven Wire Fence Co.



Makers of "Copperweld" Copper Clad Steel Wire, Armco Welding Rods and Electrical Wire; Wire Mill Products, Plain and Galvanized; Wire of Special Analysis; Wire Fencing for all Purposes; Factory Gates; Ornamental Iron Fence; Machine Guards; Tool and Stockroom Partitions; Architectural Iron.

Factories: Monessen, Pa., and Adrian, Mich.

Sales Offices: 30 Church St., New York

Western Representatives: Steel Sales Corporation, Chicago

18





The Ounce of
Prevention
Here—

Saves the Cost
of the Pound
of Cure
Here—

How much of your track maintenance goes into the repairing of deteriorated track foundation, tightening and repairing of loosened bolts and joints, realignment of track?

How much of this expense finds its original cause in neglected rail corrugations and cupped joints which are permitted to grow worse and worse until they cause all this damage to the track structure?

The more you look into these matters the more convinced you will probably become of the savings you can make by the regular use of the

RECIPROCATING TRACK GRINDER

You will find that the consistent use of this economical and efficient machine in keeping the rolling surface of rails smooth and level will eliminate a great deal of the damage to track structure which is caused by the constant impact of cars at bad spots in the rail.

Just reflect that an average car running at average speed over a rail depression of a fraction of an inch causes an impact of 5000 foot-pounds.

That is pretty severe treatment.

The Reciprocating Grinder reduces cost of track maintenance, reduces cost of car repair, and eventually saves tremendous sums in cost of track replacement. The importance of this last item is evidenced by the fact that in 1917 the cost of track replacement for the electric railways in the United States and Canada amounted to approximately *Fifteen Millions of Dollars*. And for that great sum the total replacement was only 375 miles of track.

RAILWAY TRACK-WORK COMPANY

30th and Walnut Streets, Philadelphia

AGENTS: Holden & White, Inc., 343 S. Dearborn St., Chicago.



"ARMCO" IRON CULVERTS



are installed under more miles of tracks and highways than any other make of corrugated metal culverts.

THIS TRIANGLE TRADEMARK on a length of corrugated culvert means that it is made of genuine rust-resisting "ARMCO" IRON and that the culvert is full gauge, full weight and full diameter.

Insure the permanency of your culvert installations by specifying the culvert that has for years demonstrated its rust-resisting qualities under all conditions of soil and climate.

For full information on rust-resisting "Armco" Iron Culverts, Flumes, Signs, Sheets, Roofing and Formed Products address nearest manufacturer.

Arkansas, Little Rock
Dixie Culvert & Metal Co.
California, Los Angeles
California Corrugated Culvert Co.
California, West Berkeley
California Corrugated Culvert Co.
Colorado, Denver
R. Hardisty Mfg. Co.
Delaware, Clayton
Delaware Metal Culvert Co.
Florida, Jacksonville
Dixie Culvert & Metal Co.
Georgia, Atlanta
Dixie Culvert & Metal Co.
Illinois, Springfield
Illinois Corrugated Metal Co.
Indiana, Crawfordsville
W. Q. O'Neill Co.
Iowa, Des Moines
Iowa Pure Iron Culvert Co.
Iowa, Independence
Independence Corrugated Culvert Co.

Kansas, Topeka
The Road Supply & Metal Co.
Kentucky, Louisville
The Kentucky Culvert Mfg. Co.
Louisiana, New Orleans
Dixie Culvert and Metal Co.
Maryland, Baltimore
The Maryland Culvert & Metal Co.
Massachusetts, Palmer
New England Metal Culvert Co.
Michigan, Bark River
Bark River Bridge & Culvert Co.
Michigan, Lansing
Michigan Bridge & Pipe Co.
Michigan, Bay City
U. S. Bridge & Culvert Co.
Minnesota, Minneapolis
Lyle Corrugated Culvert Co.
Minnesota, Lyle
Lyle Corrugated Culvert Co.
Missouri, Moberly
Corrugated Culvert Co.

Montana, Missoula
Montana Culvert & Flume Co.
Nebraska, Wahoo
Nebraska Culvert & Mfg. Co.
Nevada, Reno
Nevada Metal Mfg. Co.
New Hampshire, Nashua
North-East Metal Culvert Co.
New Jersey, Flemington
Pennsylvania Metal Culvert Co.
New York, Auburn
Pennsylvania Metal Culvert Co.
North Dakota, Wahpeton
Northwestern Sheet & Iron Wks.
Ohio, Middletown
American Rolling Mill Co.
The Ohio Corrugated Culvert Co.
Oklahoma, Shawnee
Dixie Culvert & Metal Co.
Oregon, Portland
Coast Culvert & Flume Co.

Pennsylvania, Warren
Pennsylvania Metal Culvert Co.
South Dakota, Sioux Falls
Sioux Falls Metal Culvert Co.
Tennessee, Nashville
Tennessee Metal Culvert Co.
Texas, Dallas
Wyatt Metal & Boiler Works
Texas, El Paso
Western Metal Mfg. Co.
Texas, Houston
Lona Star Culvert Co.
Utah, Woods Cross
Utah Corrugated Culvert & Flume Co.
Virginia, Roanoke
Virginia Metal Corp.
Washington, Spokane
Spokane Culvert & Tank Co.
Wisconsin, Eau Claire
Bark River Bridge & Culvert Co.

Canada—Canada Ignat Iron Co., Ltd., Guelph, Sherbrooke, Winnipeg, Calgary

"ARMCO" IRON RESISTS RUST



Where Rails Join

This is the point in the track that fails first. With ordinary ties, even the loosening of a fish plate will start the joint to knocking.

Here is a sure method of making the tie bind the rail ends permanently to both surface and alignment.



The Dayton Mechanical Joint Tie shown in this illustration is our answer to the "loose joint" problem. One tie block with the added security of a steel plate carries the ends of both rails. The cushion feature is here also.

It is absolutely impossible for one of the rail ends to sink even the smallest fraction of an inch below the level of the other end on the same block.

Absolutely perfect surface and alignment is the result with all the attending advantages of freedom from shocks to rolling stock, decreased noise and economy of maintenance.



THE DAYTON MECHANICAL TIE CO.

201 Third Street Arcade
DAYTON, OHIO



Stop your splice bar fractures

by avoiding the wear
that makes them
start!

You do this
by equipping with

Lackawanna

**Safety-Head
Angle Bars**



Angle bar fractures originate mainly in wear and cutting at the top, the break then apparently developing from the back action or upward thrust of the rail ends.

The Lackawanna Safety Head Angle Bar overcomes the liability to break by eliminating the initial causes. This is accomplished by depressing the metal in the head of the angle bar for a short space at the center where the rail ends meet, so that the bar will not be cut or worn by the action of the sharp under corners of the rail heads at the ends. The metal in the angle bar therefore retains its original skin and finish without destruction or upsetting under the pounding of the wheels at the joints, and in this condition is able to resist the severe strain due to the upward thrust of the rail ends caused by the passing loads.

A trial of Safety Head Angle Bars where the ordinary kind have given most trouble will soon prove our construction capable of big savings and greater safety. Write for further information.

Ask for Our Booklet
"Improved Track Appliances"

291

Lackawanna Steel Company

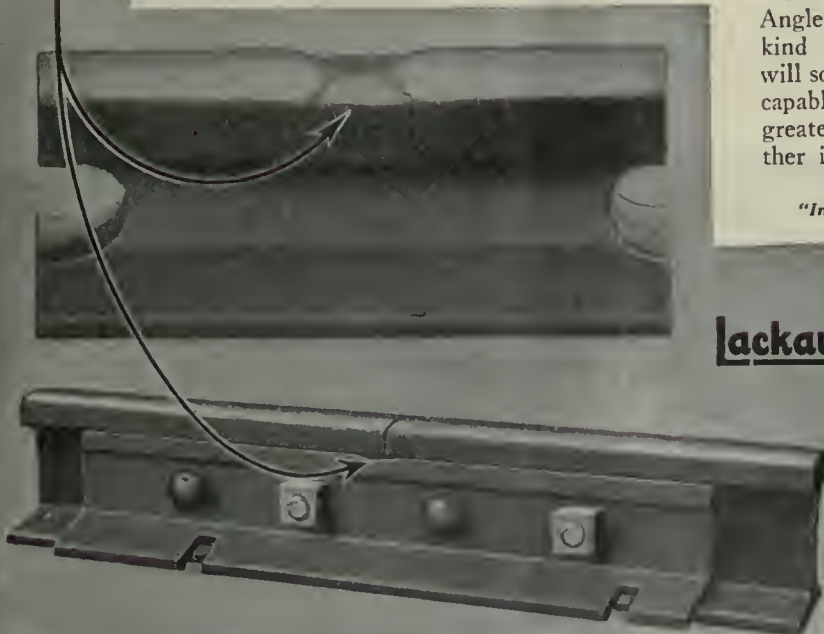
LACKAWANNA, N. Y.

ATLANTA
BOSTON
BUFFALO

CHICAGO
CINCINNATI
CLEVELAND

DETROIT
NEW YORK
PHILADELPHIA

ST. LOUIS
SAN FRANCISCO
HAVANA



The Indianapolis Portable Welder Will Pay You a Steady Profit

Out of All Proportion
to Cost and Maintenance



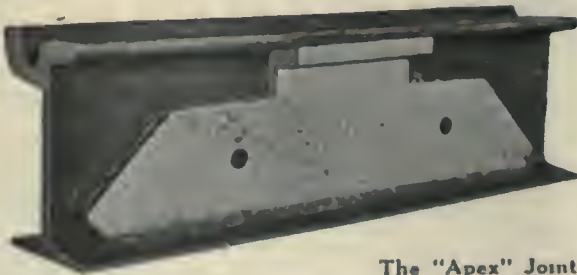
*Makes Old
Rails Last
Years Longer*

THIS welder, operated by unskilled help, will pay for itself many times over again in the money it saves by repairing and reclaiming broken, worn or guttered track, damaged switch tongues, frogs and switches.

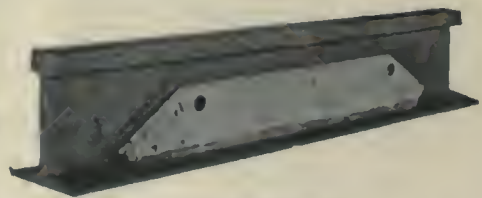
Material was never so high as today. New track is prohibitively high. The Indianapolis Portable Welder will reclaim your old rails and make them new again at small expense. These welders are saving countless thousands of dollars today for 95 per cent. of the important electric railways of the country.

The Indianapolis also makes welded rail joints. Indianapolis Joints and Bonding Plates save loss of current for they have greater conductivity than the rails.

Users of Indianapolis Patented Welders, Joints and Welding Supplies are fully protected.



The "Apex" Joint
for Guard and Girder Rails



The "Simplex"
Joint for High Tee Rails

Indianapolis Switch & Frog Company
Springfield, Ohio

POWER ECONOMIES—

*“—another consideration was that the information furnished is in the EXACT UNITS in which we are interested, viz., K.W.H. per car mile * * * the third consideration was probably the LOWER FIRST COST”*

ECONOMY METER CARD		
LINE _____		
MOTORMAN _____		
CAR NO. _____ DATE _____		
TRIPPER NO.		
RUN NO		
TIME OFF		
TIME ON		
NO. OF TRIPS		
READING OFF		
READING ON		
DIFF		
REMARKS: (NOTE EQUIPMENT DEFECTS, RE OR LOST MILEAGE, ETC.)		
SPACES BELOW FOR OFFICE USE		
Mileage	KWH	KWH—CM

Motormen's Daily Record Card



The Watchdog of Your Power

a device for checking and inducing the saving of car-propulsion energy—

wrote one general manager to another in reply to a query as to why he had selected the

ECONOMY METER

for his road.

The reply set forth precisely what we have contended is a vital advantage in

IT METERS THE ENERGY— THAT'S WHAT YOU WANT TO SAVE!

Another reason pointed out in the letter, for the selection of the ECONOMY Meters was that the road operated over heavy grades, which, in the manager's opinion, would make of little value the results obtained from any other checking instrument or power-saving device. On all lines but one there are a number of grades ranging from 2% up as high as 10%. Power saving *with ECONOMY Meters* does not militate against "Safety First."

The above points of superiority are of great importance to the prospective purchaser of an energy-saving device of this character.

That any road not now equipped with ECONOMY Meters needs them as a vital adjunct to its power- and coal-saving campaigns, we can very quickly and convincingly demonstrate if you will give us the opportunity.

Let us send you our bulletins on power saving.

ECONOMY ELECTRIC DEVICES COMPANY

L. E. Gould, Pres.

Exclusive Sales Agent Sangamo Economy Railway Meter
Old Colony Bldg.

Chicago



Irvington Black Varnished Cambric

Will Help You to

Prevent Repeating Last Winter's Motor Breakdowns

Last winter's lesson was too severe to be easily forgotten.

Thousands upon thousands of car miles were lost, much war work was hindered and considerable discomfort was caused to car riders because the motor insulation was too weak to buck the snow and slush.

Now is the time to avoid a repetition of this costly experience by ordering

Irvington Black Varnished Cambric

Time Proves Its Superiority

Black and Yellow Varnished Cambric
 Black and Yellow Bias Cambric Tape
 Oiled Silks Oiled Papers
 Black and Yellow Insulating Varnishes
 Black and Yellow Flexible Varnished
 Tubing

IRVINGTON VARNISH & INSULATOR CO.

Irvington, New Jersey.



Experience with car wheels proves there are none tougher, more resilient, more uniform, more dependable and longer wearing than Davis One-Wear Steel Wheels.

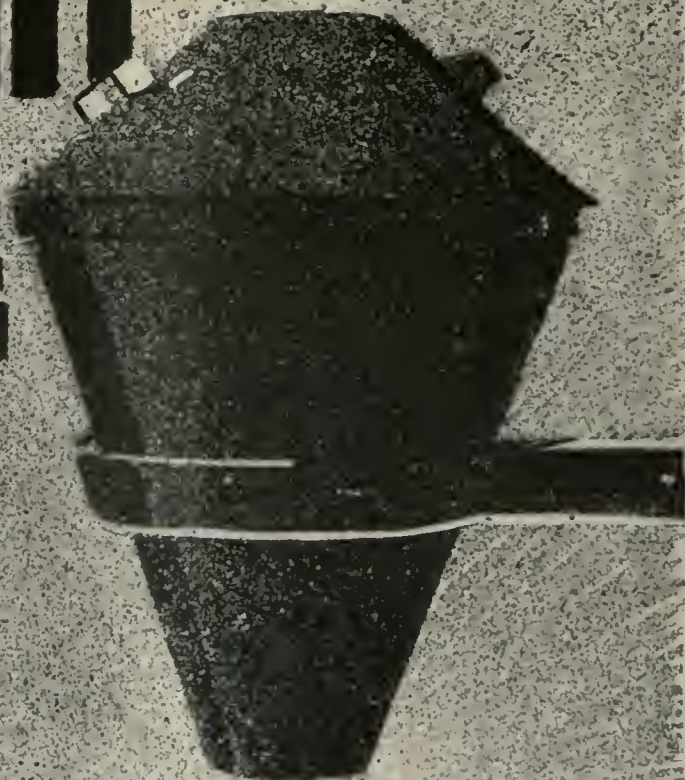
They are the standard for electric railway service.

American
Steel Foundries

1100 McCormick Building
CHICAGO

DAVIS STEEL WHEELS

THERMIT RAIL WELDING



SIMPLICITY

The simplicity of the Thermit apparatus used to weld rails enables you to undertake the welding of a small or a large number of joints with equal facility. The weld and reinforcement of Thermit steel fused around it insures an electrical conductivity equal to that of the rail itself; at the same time, the full strength of the rail is developed.

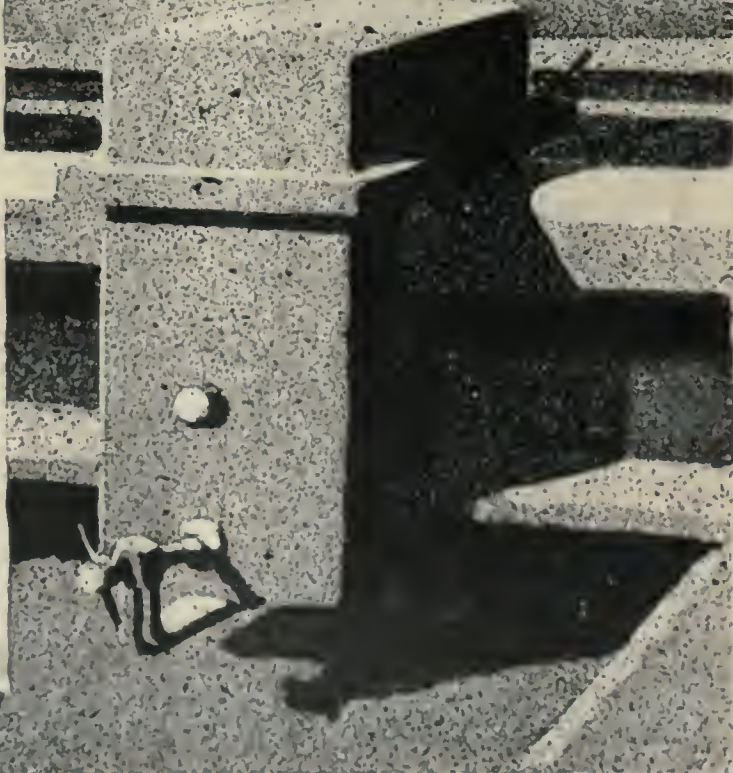
Write for Catalog today.

**Metal & Thermit
Corporation**

120 Broadway, New York

Successors to

Goldschmidt & Detinning Co.
Goldschmidt & Thermit Co.





©International
Film Service

The First Woman Guard on the New York Municipal
Railway's Rapid Transit Cars, 250 of which have National
Pneumatic Door Engines

Women "Making Good" *by the* Thousand

Recently an official of the Brooklyn Rapid Transit System and New York Municipal Railway referred to the women conductors and guards on his system in these terms:

"These plucky women have rendered a great public service and are proving their ability to fill a man's job."

More than 2000 women are already employed by the electric railways in New York and vicinity for platform and other service. Hundreds of them are conductresses or guards **ON CARS EQUIPPED WITH NATIONAL PNEUMATIC DOOR AND STEP CONTROL.**

If you want to put car platform requirements on the simple basis of fare collection with all heavy manual labor eliminated, we can fit your present air-brake cars with National Pneumatic Door and Step Control at modest cost. What are your requirements?

NATIONAL PNEUMATIC COMPANY

INC.



50 Church St. New York

515 Laflin St. Chicago

Cumulative Evidence

THE ARTHUR POWER-SAVING RECORDER CO.
SECOND NATIONAL BANK BUILDING
NEW HAVEN, CONN.

April 1, 1918.

To the Editor,
Electric Railway Journal
10th Ave at 36th St.,
New York, N. Y.

My dear Sir:-

The influence exerted by your journal in the electric railway field, has recently been brought home to me in a very striking way. About a month ago you published a short note referring to the Connecticut Company's power saving campaign, and mentioned that a small handbook on power-saving, written especially for motor-men and conductors, and used by me in this campaign, could be had at cost by other companies for use on their properties. The result of this brief mention has been astonishing. From all over the country, from the Atlantic to the Pacific and including Canada, has come a flood of requests for copies. Frequently our mail would contain requests from the widest possible diversity of ranks, i.e., from motormen, chief motormen, shopmen, master mechanics, superintendents, managers, and railway presidents. I have had temporarily to engage additional help to take care of the added work.

Very truly yours,

William Arthur
General Manager.

I may say that the interest shown during the past few weeks in both the new recorder and the handbook, has been very great. More than 50 companies have written me since I advertised the new feature, asking for quotations and detailed information. This speaks well for the value of advertising in your Journal.

Yours truly,

William Arthur
General Manager.

If you have anything of interest for the electric railway industry you may be sure of an audience through the pages of

ELECTRIC RAILWAY JOURNAL

What Will Your Rating Be If This Policy of the Fuel Administration is Made to Apply to Use of Power on Cars?

506

POWER

Vol. 47, No. 23

Federal Inspection of Power Plants

Power Plants Must Be Efficient As Well As Safe
The Needlessly Wasteful the Last To Get Fuel

*Read
This*

IT HAS been definitely determined by the United States Fuel Administration to institute a system of classification of power plants, based upon the care and efficiency with which they are operated, and the idea has received the approval of fuel administrators in New England, Connecticut, New York and Pennsylvania. The details have been worked out by David Moffat Myers, Advisory Engineer of the United States Fuel Administration.

It is estimated that from 25,000,000 to 50,000,000 tons of coal per year can be saved in power plants, simply by the more careful and intelligent use of existing apparatus and the elimination of easily preventable waste. To effect this purpose an Administrative Engineer will be appointed in each industrial state, to be attached to the office of the State Fuel Administrator. W. R. C. Corson, of the Hartford Steam Boiler Inspection and Insurance Co., is to be the engineer for Connecticut; E. N. Trump, vice president of the Solvay Process Co., for New York; Thomas R. Brown, of the Westinghouse Air Brake Co., of the Pittsburgh district; and Walton Clark, vice president of the U. G. I., of the Philadelphia district of Pennsylvania. Other states will be organized as fast as possible. A questionnaire will be sent by these engineers to the owner or operator of each fuel-operated power plant in the state, asking him to furnish the administrator within a stated number of days such information as the type and number of boilers; kind of service or product; kind of draft and method

will be given a rating, based upon the data so obtained. The ratings will be divided into five classes, and in case of a fuel shortage the plant that has been found to be needlessly wasteful will be one of the last to be allowed to draw upon the available supply.

It is recognized that plants must be dealt with as they are found. No extensive and expensive installations of more efficient apparatus will be expected, but there are many economies that can be brought about by stopping leaks in boiler settings, repairing baffles, covering heat-radiating surfaces, trapping outlets, returning drips and making an intelligent use of the exhaust. A plant will be judged, not on its inherent efficiency as a plant, but by the use which it makes of its own conditions and opportunities. The whole attitude of the administration will be one of suggestive helpfulness rather than of coercion. The inspectors who visit the plants to verify the questionnaires will in many cases be able to give sound advice, and the State Administrator will be furnished with a list of approved professional consulting engineers to whom power-plant owners may turn for more extensive consultation.

The Fuel Administration is also preparing a series of official bulletins on Steam and Fuel Economics. These will include boiler and furnace testing, flue-gas analysis, saving steam in heating systems, boiler-room accounting systems, saving steam and fuel in industrial plants, burning fine sizes of anthracite, boiler-water treatment, oil burning, stoker operation.

One of the definite and explicit recommendations of the Fuel Administration in the enforcing of this policy is "that a competent man or committee be detailed for the work of fuel conservation in the building or shop outside of the power plant." In other words the rules shall apply at points where power is *used* as well as in the power plant where the power is *generated*.

The experience of electric railway companies in making power-saving campaigns based on the use of

The Arthur Power-Saving Recorder

has definitely proven that such methods save large amounts of power (coal).

Initiating such campaigns and equipping cars with Recorders can be accomplished in time to insure and conserve your next Winter's fuel supply *if you act now.*

We are at your service.

The Arthur Power-Saving Recorder Co.
Second National Bank Building, New Haven, Conn.



*"It behooves you
to Hooverize
your motormen"*



The Busy Public Appreciates the Real Protection of **H-B Life Guards**

H-B Life Guards met with quick and lasting popularity both by the Electric Railways and the public.

Modern cars are designed for safety. H-B Life Guards make the safety cars safer. Their dependability has been proven by time and experience. Protecting to the fullest, the safety

of the busy public, is the most important factor in trolley operation. Is it then worth while to investigate the H-B Life Guards when many lives and limbs may depend on it for safety?

H-B Life Guards furnish automatic, instantaneous and positive protection.

The Consolidated Car Fender Co.

Providence, R. I.

General Sales Agent

Wendell & MacDuffie Co.

61 Broadway, N. Y.



Seattle, in the stirring winter of 1855-56, missed annihilation by 15 jumps, as the veracious chronicles of the Washington Indian wars assert.

“Seattle” was a Flathead Indian

who carried on a bitter warfare against the Duwamish tribe, and who later conquered them and forced them to acknowledge him as their chief. He was a true friend to the white settlers.

Some 2000 hostile Indians attacked the settlement (then nameless) in October, 1855, when it had 50 souls and 30 houses, with about 120 white people living in a radius of 30 miles. A long drawn out battle was fought and the Indians carried the first line of defense and came “within 15 jumps of the main position” (which they could have taken in a moment) when they hesitated and withdrew for consultation. During the powwow that followed, an American warship entered the harbor; marines and sailors were sent ashore, while “Seattle” with his warriors appeared in the rear of the attackers, and the Indians were chased back to the mountains.

The young settlement, like many another, owed its preservation to the United States marines.

The development of the Pacific Coast, the gold discoveries in Alaska, and the great trade possibilities with China, Japan and Australia have combined to make the rapid growth of Seattle, the “Seaport of Success.” Its mild and salubrious climate, its fertile orchards and its splendid transportation facilities have drawn thither many thousands of homeseekers whose industry and brains helped to build up the great northwest. Although one of the youngest cities of its size in the United States, it is considered one of the most beautiful and best constructed.

And like every other American city, young or old, Seattle owes much of its rapid progress and growth in wealth and culture to the efficiency of American methods of transportation.

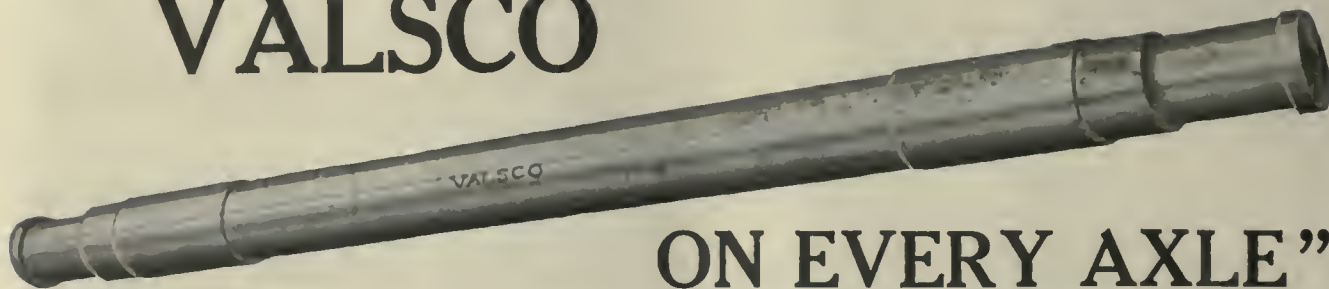
In these methods

Galena Oils

and Galena Service have played and are playing an important part in the field of interstate and transcontinental lines as well as in the field of street and inter-urban service.

Galena-Signal Oil Co.
Franklin, Pa.

"LOOK FOR VALSCO



ON EVERY AXLE"

—"*Electroheat*" Axles



THE word
"VALSCO"
branded
plainly on
the shank
of every
"Electro-

heat" Axle is our method of identifying to you the only line of steel axles heat-treated by electric furnaces—a process of heat-treatment that insures not only *better* axles, but manufacturing *uniformity* in production—a process applied to and practiced exclusively in the manufacture of axles by the Laclede Steel Co.

"Look for VALSCO on Every Axle!" It is a guarantee of maximum strength and wearing quality—an assurance of greater over-all axle service and larger factor of safety combined.

Remember—"Electroheat" Axles *have* to give better service. The process of heat-treating is *metallurgically right!*

Note: "Electroheat" Armature Shafts possess the same torsional shock resisting qualities as "Electroheat" Axles, being heat treated by the same process. They minimize service breakdowns and maintenance costs.



"If Heat-Treated Electrically—It's a VALSCO"

LACLEDE STEEL COMPANY

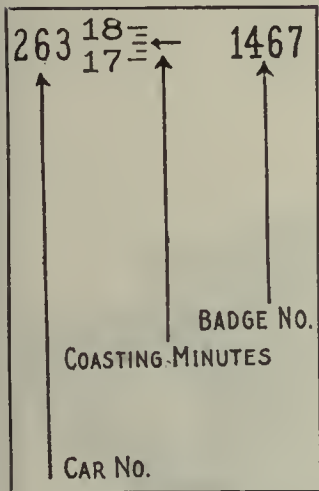
General Offices: Federal Reserve Bank Building

St. Louis, Mo., U.S.A.

Don't do by hand what should be done by machine

Rico Coasting Recorders

Automatically Print Their Own Records



*Information on Printed
Voucher-Slip from the
Rico Coasting Recorder*

With car-checking efficiency records made
by hand — — — —

Accurate taking of records by the average motorman is practically impossible because of liability of error in reading, because of poor handwriting and because many records are turned in on blurred or smudged cards.

The inevitable result is that motormen and management lose confidence in the checking system.

The Rico Coasting Recorder is immediately and permanently popular with the motormen and the management because it prints *automatically trip by trip* what both want to know. No need to bother the men, no liability of errors in copying, no chance for misunderstanding and distrust.

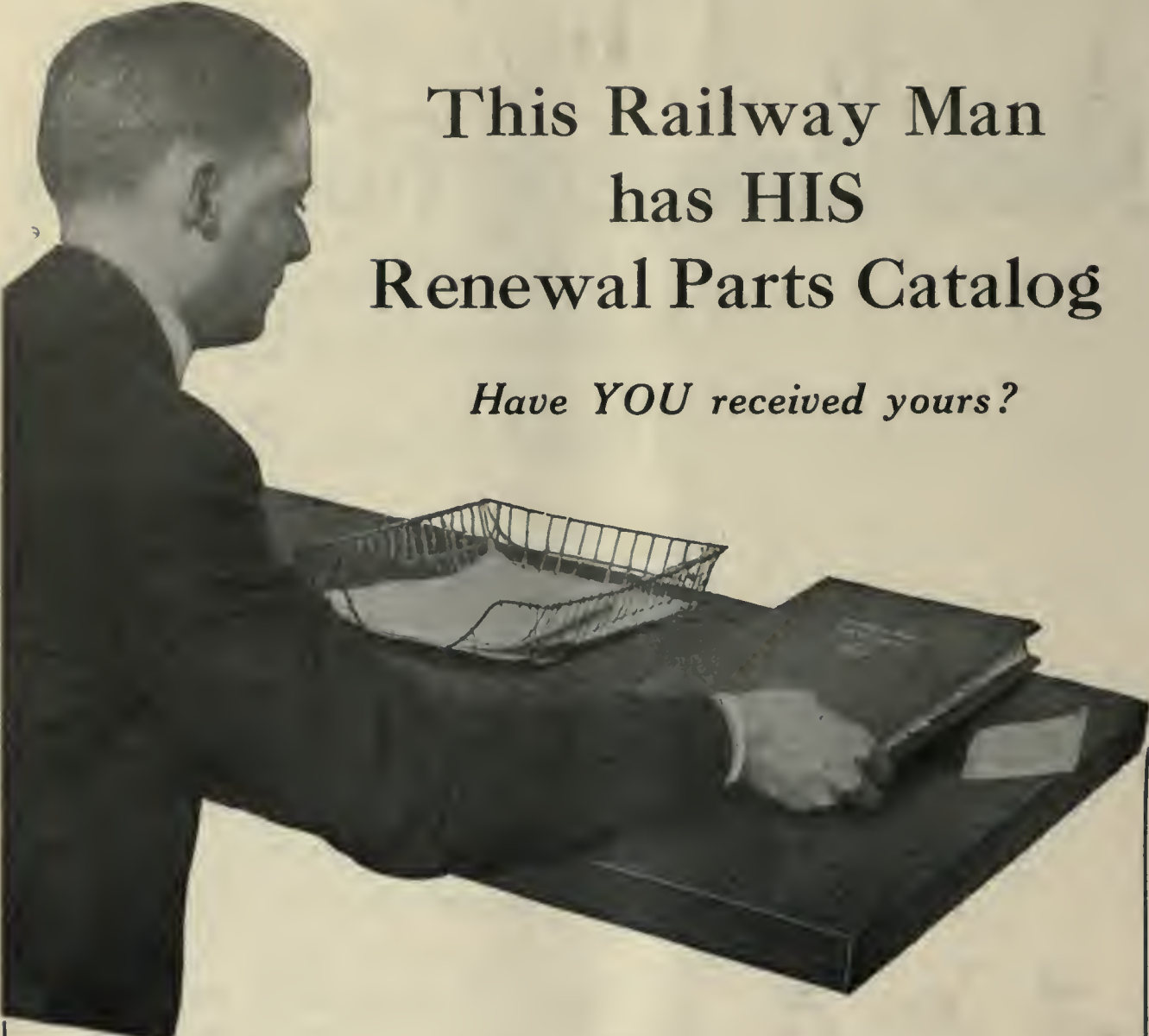


Time is the Essence of Railroading

RAILWAY IMPROVEMENT CO.



61 BROADWAY, NEW YORK



This Railway Man has HIS Renewal Parts Catalog

Have YOU received yours?

A Renewal Parts Catalog will be made up for your company without cost. It will cover completely every G-E equipment on your particular lines. The various sections of the catalog will be indexed for ready reference when ordering new parts.

The following partial list of contents illustrates the Catalog's completeness:

Illustration of each supply part. Diagrams of motor windings.

Diagrams of rheostat and car wiring. Diagrams of compressor and piping.

After you receive this catalog it will be automatically kept up to date without trouble to you.

It's a free service but a valuable one

General Electric Company

General Office:



Schenectady, N. Y.

Sales Offices in All Large Cities

7538

Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

Volume 52

New York, Saturday, August 3, 1918

Number 5

Vacation Awards for Accident Prevention

THE conscientious operator is ever seeking some way of rewarding the careful motorman and conductor. Money bonuses are the first to come to mind, but these often prove less attractive to the recipient than the equivalent in time off. Perhaps the reason for this is that an extra \$2.50 or \$3.50 looks just like the kind of payment which he gets for ten hours labor and does not seem a large amount to pay for three or six months of freedom from accidents. So why all this bother to be super-alert?

About a day off there is more glamor. It is a return to freedom and to recuperation which in themselves will help him to keep the accident slate clean when he goes back to work. The vacation means more to him than the equivalent in money. The length of such a vacation should depend upon accident conditions. The critical point in the graph would be where the vacations cost more than the accident saving. Whatever basis is worked out, however, it should be an individual rather than a group award as there is no reason why an indifferent motorman should get the same treatment as the man who is extra careful.

The One-Man Car Now a National Question

THE unadorned term "one-man car" has meant so many different things that we are happy to be able to put on record in this issue the statement on that subject by the War Board of the American Electric Railway Association. We are still happier to add that this statement was prepared in response to the request of the National War Labor Board.

In the course of the electric railway wage hearings which this board is conducting it has been natural to bring up any and every means that would permit electric railways to operate at lower costs. One-man cars were among the means mentioned, and deservedly so, for the one-man car has also proved wonderfully effective in giving more service to the public. One need read only the association's digest of one-man car service in ten cities of 21,000 to 400,000 population to realize that the right kind of one-man car service is a boon to the public as well as to the railway.

These results have been achieved, of course, only with those one-man cars in which the car operator's desires have been met by the installation of automatic equipment to replace hand labor, and in which the passenger's desires have been met by shorter headways and faster schedules. Those who object to such an innovation are as short-sighted as the workmen who destroyed the first typesetting machines. In fact, they are even

more shortsighted, for it is certain that only the use of the one-man automatic car can save hundreds of electric railways and thousands of electric railway jobs even if we pay no attention to what this car means as a conservator of the resources of the nation.

There is a Vital Relation Between Wages and Electric Railway Incomes

WHEN once the public is convinced that additional incomes allowed to electric railways will largely go into increases in employees' wages, there will be much less reluctance to allow the companies to collect more money. People seem to have a prejudice against providing for a return upon capital, but as a rule they have more sympathy with any movement toward reasonable increases in wages. It would be futile to urge that the capital now invested in the electric railway business be allowed to earn more than a reasonable return, but the arguments of employers and employees alike to the effect that more money must be collected if higher wages are to be paid are receiving careful attention from governing bodies and from the public itself.

We have no desire at this time to argue regarding the relative rights of labor and capital to a return upon their respective investments. We believe that the workers should be well paid, wages being determined upon a basis of justice, and we believe that in the long run justice will be meted out to capital as well. What we want now to emphasize is that the necessity for paying higher wages is a much more potent argument with the public than high prices of materials and difficulty of attracting new capital. The electric railways should make the most of the situation, frankly stating, however, that the necessity for granting higher wages is but one of several reasons for increases in fares.

Somehow or other fares should be more or less automatically adjusted with cost of labor, just as modern electric power contracts involve rates contingent upon the price of fuel. If coal costs more per ton, the kilowatt-hour in many companies' power contracts advances in price automatically by an equitable amount. Such a provision is essentially made in certain modern electric railway franchises which permit fare increases when the working capital falls below a fixed amount, and provide for corresponding reductions.

Higher wages are justified and must come both on account of competition and increased cost and standards of living; by way of corollary, higher fares are necessary (that is, more income per passenger-mile) to pay not only the higher wages but also the higher cost of money and of supplies. We look forward to the day when an increase in the cost of a car ride will be viewed with the same equanimity as a boost in the price of milk or mushrooms.

Roundabout Is the Shortest Way in Washington

THE customary rectangular layout of American cities doubtless accounts largely for the absence of the belt, circle or ring line to be found in a number of the larger European cities. Hence, it is worth stating that Washington, for which John A. Beeler has just suggested a belt line, also happens to be a city with a large number of radial avenues with the Capitol, the White House and various monument squares as the starting points. The need for the belt line is the enormous expansion of the Army and Navy departments in what, from the traffic standpoint, is an offside portion of Washington. In fact, a distressingly large area of beautiful park ground has been destroyed to make room for both temporary and permanent buildings. Now has come the job of transporting about 25,000 people with satisfaction to themselves and with minimum expense to the railway. Two ways are possible: The first, to route cars through from all over the city; the second, to distribute the riders via a belt line with transfers to other lines.

At first glance the through-routing scheme looks the more satisfactory, because the distances are less. Actually it is not so desirable because of the time lost through the inefficient use of cars in the congested area. Moreover, in this particular case, it was found that through routing would have meant the installation of a much larger amount of new special work.

In brief, the proposed belt line is not too far from the center of the city to be wasteful of mileage and time; it would tend to subtract from the central congestion rather than to add thereto and, finally, it would be free from the handicap of European belt lines in having a large number of free transfer points, since there are fully twenty in 6 miles. In fact, the shortness of the line, its inside location and the ease with which passengers can transfer to the nearest through route offer a direct solution for not the least important problem brought on by this mightiest of wars.

How Freight Can Be Hauled at No Cost for Power Plant or Track!

ONE of the ghosts of the average operating man contemplating freight haulage is that the power house and substation equipment will not permit it. This one excuse has in too many cases stood in the way of the development of a freight service that would be of great economic value to the community served. Hence, it would be well for all railway men to analyze their power conditions before permitting this threadbare excuse to cheat them out of a lucrative revenue and the possibility of rendering an invaluable service to their communities.

Analysis will show that for freight service, whether the motive power equipment is placed under a flat car or regular electric locomotive, there must be some differentiation in the design from that for passenger propulsion. Freight trains need not move at passenger speeds, so that the use of passenger motive power equipment should be eliminated entirely, when freight service is considered. The fact that many roads operate freight motor cars on practically passenger time has shown operating officials that the power demands of this service are heavy and has led them to believe that

all freight service exacts a large amount of power. Since speed is obtained at the expense of power and high speed is not necessary, two ways are open:

1. Equip freight motor cars with low-speed locomotive motors, capable of propelling the motor car and hauling two or three trailers. This type of operation could be conducted in many cases during the day time between passenger trains, if long sidings are provided.

2. Haul standard steam railroad freight cars at night with low-speed-motor electric locomotives.

During these off-peak hours on many systems the property is lying practically idle so that any use at such times will not only increase the revenue but will improve the load factor. In other words, there would be no cost for power equipment, simply for the energy used.

Massachusetts Shows a Good Record of Fare Increases

SINCE early 1913, when the Massachusetts Public Service Commission was established with broader powers than the predecessor board possessed, no fewer than twenty-four of the thirty-seven electric railways under the commission's supervision have been allowed increases in fares. These increases apply to about 1900 miles of line out of 2050 miles operated by the companies in the Bay State, with the exception of the Boston Elevated Railway, which, as our readers know, is now run under a public control law. Expressed in percentage of miles of track, 92½ per cent have raised their fares and 3 per cent more have received permission to do so, leaving only 4½ per cent whose fares are not yet increased. In Boston a 7-cent fare was put into effect on Thursday of this week on all the lines of the Boston Elevated Railway. These figures effectively dispose of the idea still held in some quarters that the commission has been slow to appreciate the financial needs of the roads, and a detailed study of the rates allowed shows that the old nickel fare has at last become outlawed as the measure of a proper charge for service.

As might be expected, the fares allowed under the board's decisions show a wide range. There have been straight increases to 6 and 7 cents on properties serving city as well as suburban and rural territory, and in one case a 10-cent fare has been imposed without enough opposition on the part of the public to require formal proceedings by the commission. An 8-cent fare has been approved for certain lines; reduced-rate tickets have been withdrawn in a number of instances, and the length of the fare zones shortened in others. On still other properties the replacement of the old 5-cent fare system by some form of zone system has taken effect. The maximum rate per mile now authorized on any electric road to the State appears to be 3 cents, while 2½ cents has become common in the face of the advance in steam railroad passenger rates and the still increasing costs of operation. The Massachusetts tariffs now on file at the office of the commission furnish a veritable museum of interest to the electric railway traffic officer and fare specialist.

The public has come to appreciate the need of paying higher fares, but it is doubtful whether the increases so far put into effect are capable at present of yielding a really fair return upon the investment. Case after case analyzed by the commission shows that patronage

has fallen off following any substantial fare increase. The various appeals to thrift and patriotism, combined with the amazing purchase and operation of private automobiles in Massachusetts, have done their part. On the other hand, jitney competition is better regulated to-day than formerly.

Owing to the many conflicting causes present it is obviously impossible to tell at all closely the ratio which should be expected between an increase in fares and the corresponding increase in receipts, but as conditions themselves during the war are constantly changing, this ratio even if known for any property at any particular time would not remain constant for any length of time.

Fight—But Don't Forget

To Prepare for Peace Problems

PEACE will come some day. Just now, of course, our primary job is to help win the war, but even during these fighting days it is well for men to look ahead to the inevitable readjustment that must come with the end of hostilities. Our allies—even our enemies—have begun in an organized way to prepare for reconstruction. What must we do?

Our Washington representative, Wingrove Bathon, who has made a careful study of the question, answers it in this way: An agency should be created immediately to gather facts now, lay plans now, educate the public now and lead the nation's industries in the victories of peace when the right time comes. He suggests a Readjustment and Reconstruction Commission, appointed by executive order of the President and composed of leaders in all private industrial effort, to be assisted by an Advisory Council of government officials and legislators especially charged with the conduct of affairs vital to the industrial, commercial, transportation, labor, financial and educational worlds.

Beyond the shadow of a doubt such a co-ordinated organization would render a great service to the American people and even to the whole world, in view of the part our resources must play in the general reconstruction. The post-war problems are sure to come. Not only will there be the problems of the orderly reintroduction of returned soldiers into industry, the use of the productive capacity expanded for war needs and the development of export trade, but also the questions of how to deal with the myriad of other subjects upon which, as a result of the times, the public is already doing accelerated thinking. Returning observers tell us that even now in Europe there is a widespread radicalism and extremism hardly dreamed of here. It is not too much to say that our whole economic system will be in a state of flux in the post-war period. It would be folly not to recognize these facts and not to take every possible step to see that the nation advances along lines of the most sound development.

England has already risen to the opportunity and the duty of the hour. Through the Ministry of Reconstruction and its Advisory Council investigations are already under way in such matters as finance, shipping, labor and industrial organization, rural development, the machinery of government, health and education, housing and internal transportation. Take, for example, the two vital topics of labor and internal transportation. The study of the former is covering conciliation

and arbitration, a general labor survey, army demobilization and the like. Committees for the latter are investigating control of public utility societies, town planning and the whole inland system of transport. The ministry is in consultation with the Board of Trade concerning the future of the railways, and an inquiry has been begun into the question of storage and distribution as essential elements in transportation policy.

This country should do likewise, and the public utilities should help the movement in every way. They should, of course, be represented in the national commission, for they will have post-war problems of rates, labor supply, financing, acquisition of new facilities from the manufacturers and other important matters for readjustment. Nor should their importance be depreciated in any way, for their present vital essentiality, which the President and other government officials have been prompt to recognize, will not abate in the slightest degree during the days of reconstruction. Then, as now, maximum utility efficiency will be necessary to the nation's welfare.

The Agitation

for Higher Fares

IN AN instructive article in the *Survey* for July 20, William L. Ransom, chief counsel for the Public Service Commission for the First District of New York, urges a higher fare for electric railways and gives expression to the following truth which he emphasizes by italics: "The public can have in transportation or public utility service only what it is willing to pay for and there is no way of getting something for nothing for the public, from the public utility, over any considerable period of time." For this reason he believes the municipalities ought not to bar necessary increases in rates merely because they can bar them, but he thinks that in return for the removal of the 5-cent fare limitation the cities might insist on some changes in franchise terms for public protection. Specifically he says: "Lines and portions of lines that are no longer necessary or desirable should be abandoned and not continued as drains upon the resources of the systems. In many instances, rail lines on the surface are obsolete and should give way to improved and more economical facilities. 'Water' should come out of stock; the power of 'extortion' possessed by the holders of 'pioneer franchises,' covering essential links of the present-day system, should be broken. * * * Old franchises, granted in reckless disregard of public rights as to duration, terms and the like, may now be put on a fair, modern social basis."

On the general lines laid down by Mr. Ransom under which electric railways may secure their higher fares, he will find few who will disagree with the terms. The taxation of perpetual franchises has caused them to be considered with less esteem than formerly, and a fair modern franchise which will grant a reasonable return on the investment in the enterprise would be welcomed by most companies, but time is required to establish just and reasonable terms. During this study, there is danger that irreparable harm will be done. The present applications are emergency ones. Let the franchise situation be considered at length, as its importance demands, but do not delay temporary fare relief in the meantime.



SPEEDED-UP TRANSPORTATION HELPS TO WIN THE WAR

Putting Car Wheels Under Shipbuilders

Division of Passenger Transportation and Housing of Emergency Fleet Corporation on June 17 Reported Adequate Service in Eighty-five Out of One Hundred and Sixty-four Shipyards—Complete Traffic Relief Secured in Twenty Other Cases, Contracted For in Six and Agreed To in Fourteen—Up to June 1 the Corporation Had Loaned \$6,000,000 for New Railway Facilities

SHIPBUILDERS must have adequate transportation to and from work. This is a national necessity, and the Division of Passenger Transportation and Housing of the Emergency Fleet Corporation is meeting it in a national way. Since this division was formally organized on April 1, it has made marvelous progress in surveying the transportation facilities and requirements in the shipbuilding districts and in aiding electric railways to make the improvements demanded by the win-the-war program.

At its very formation the Division of Passenger Transportation began to hum with activity, and it is still doing so. The results accomplished have been many, but it is impossible even now to give a definite summary. Each day sees new reports from investigators, from men checking up the progress of improvements, from men following the needs of the expanding shipbuilding industry itself. Indeed, nothing but a moving picture would do full justice to the work of the division.

Because the electric railway industry is vitally interested in what is being accomplished, however, this journal is going to give its readers a snapshot of matters as they existed during the first part of June, after more than two months of assiduous effort. This picture does not represent conditions to-day, but it is an indication of the speed and the vigor with which the division is acting, and an earnest of the greater results which are now without doubt an accomplished fact.

To understand the scope of the work along passenger

transportation lines, it is necessary to know that the sea and the lake borders of the United States have been divided into eleven great shipping districts, containing at the latest count 164 shipbuilding companies. The approximate location of the district lines is shown in the accompanying diagram.

As a means of facilitating the work of the Division of Passenger Transportation in eliminating railway deficiencies and in following up adjustments, Director A. Merritt Taylor has organized a force to work in the field. Inasmuch as it does not seem necessary, however, to provide separate field men for each shipbuilding division, Mr. Taylor has grouped some of these districts in such a way that the field-work divisions number seven. They are constituted as follows:

(a) Eastern District: This includes all shipyards in Connecticut, Rhode Island, Massachusetts, New Hampshire and Maine—headquarters, Boston.

(b) New York District: This includes Newark Bay, Staten Island, Hudson River and Long Island—headquarters, New York.

(c) Philadelphia District: This includes the Delaware River shipyards at Bristol, Gloucester and Camden, Philadelphia, Chester and Wilmington—headquarters, Philadelphia.

(d) Chesapeake Bay: This includes shipyards from Baltimore to Newport News—headquarters, Baltimore.

(e) Southern District: This includes shipyards from North Carolina to Texas—headquarters, Jacksonville, Fla.

(f) Pacific District: This includes all shipyards on the Pacific Coast—headquarters, Seattle.

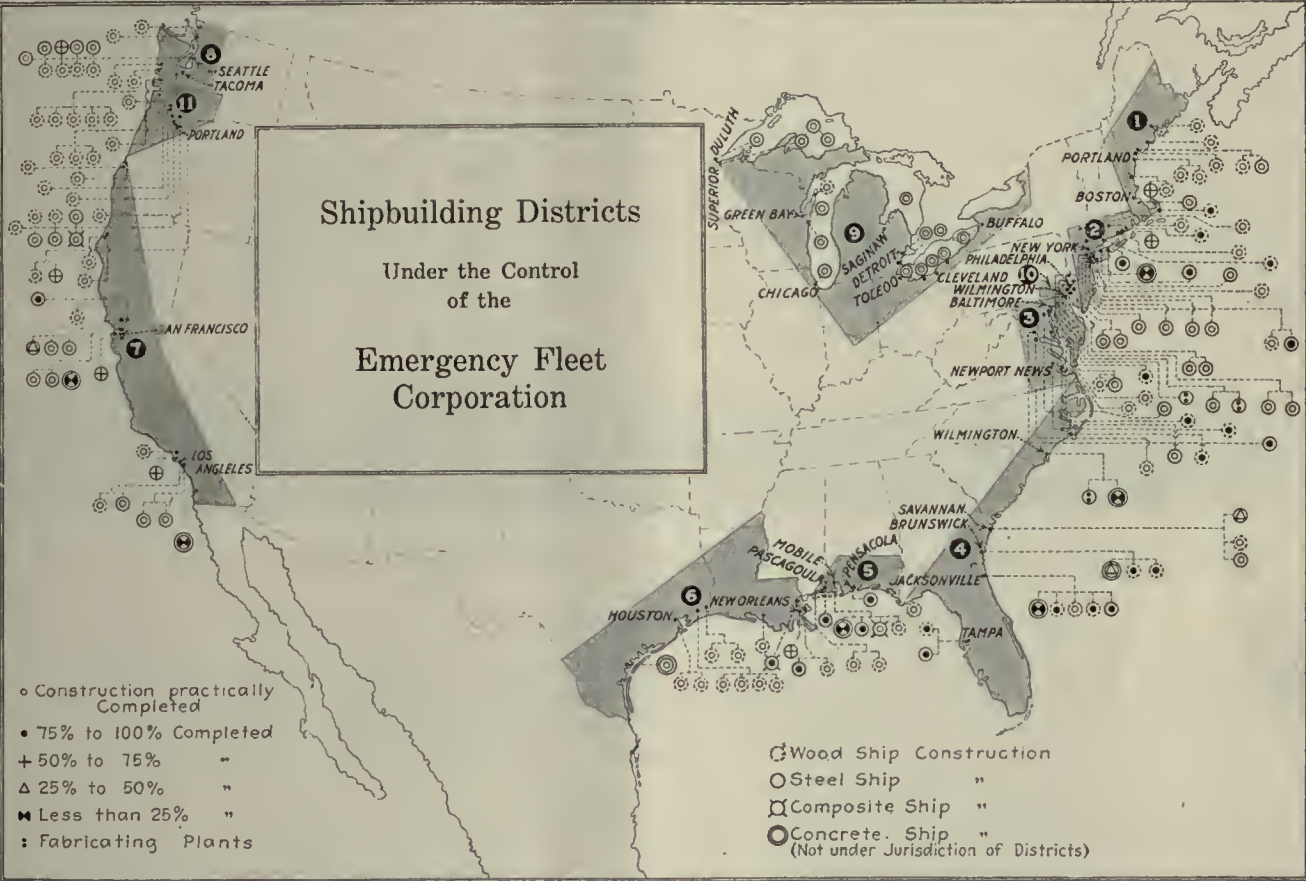
(g) Central District: This includes all shipyards on the Great Lakes—headquarters, Philadelphia.

Each field division is in charge of a district engineer located at the district headquarters. His duties are to keep in close touch with the transportation service rendered to the shipyards in his district, to watch the progress of all railway construction work and to see that additions and betterments agreed to by the railways are actually placed into effect. He also keeps in close touch with the district auditor in checking up contracts and payments authorized thereunder for additional facilities as covered by contracts. The district engineer is expected to give special attention to forecasting the

senger Transportation began at its institution to secure from shipyards and railways, together with an outline of the procedure followed in local examinations. In accordance with this procedure the organization has been carrying on its surveys throughout the country, and the general transportation situation in the nation's shipyards as of June 17 was found to be as shown in the diagram and in Table I on page 188.

MORE THAN HALF OF SHIPYARDS ARE O. K.

These exhibits tell their own story of the improving transportation conditions in the shipbuilding districts. Nevertheless, it seems worth while to emphasize here the facts that on June 17 eighty-five out of the 164 shipyards had reported no transportation difficulties at



character and the extent of additional facilities required to provide adequate transportation service for at least six months in advance.

Owing to the growing nature of the work, no fixed organization chart can well be drawn for the whole division. The approximate responsibilities and inter-relationships of the general organization, however, are as shown in the diagram on page 191.

The division is divided into two main sections. One section is devoted entirely to transportation matters and reports through its own officers directly to Mr. Taylor. The other section, which is not shown in detail in the diagram, is concerned only with housing. It is under the supervision of an assistant director, also reporting directly to Mr. Taylor. The two sections share a clerical force and an accounting and statistical department.

The ELECTRIC RAILWAY JOURNAL of May 4 contained a digest of the information which the Division of Pas-

all, and that for the seventy-six which had reported inadequacies complete relief had been secured in twenty cases, had been contracted for in six and had been agreed to in fourteen. In each of the last two cases, too, immediate partial relief had been secured in practically all instances through either the better use of existing facilities or the installation of temporary facilities. The remaining thirty-six shipyards were still under investigation. The foregoing results in the way of relief were obtained partly with and partly without financial aid from the Emergency Fleet Corporation.

\$6,014,270 ALREADY APPROPRIATED TO AID RAILWAYS

What the Division of Passenger Transportation is doing to help electric railways put themselves in a position to handle shipbuilding traffic in spite of their restricted resources is more clearly shown by the financial record for the period up to June 1. As shown in Table

TABLE I—HOW THE WORK OF THE DIVISION OF PASSENGER TRANSPORTATION IS PROGRESSING

	June 1	June 6	June 13
Shipyards reporting clear of transportation difficulties.....	83	83	85
Shipyards not reporting.....	8	3	3
Shipyards reporting inadequacies in transportation.....	73	76	76
Complete relief secured.....	13	19	20
Complete relief agreed to and contracted for immediate partial relief at these yards secured through better use of existing facilities or installation of temporary facilities.....	12	8	6
Complete relief agreed to and contracts being prepared.....	4	5	4
Immediate partial relief at these yards secured through better use of existing facilities or installation of temporary facilities.....	11	14	14
Under investigation by engineers in the field.....	7	12	12
Under investigation through district officers, through district supervisors or by correspondence.....	10	9	12
	27	26	24

TABLE II—APPROPRIATIONS UNDER CONTRACT WITH EMERGENCY FLEET CORPORATION TO JUNE 1, 1918

Location	Railway Concerned	Work	Cost
Hog Island, Pa.	Philadelphia Rapid Transit Company Philadelphia Railways	Track extensions and purchase of 160 cars	\$3,105,000
Port Newark, N. J.	Public Service Railway	Track extension and purchase of eighteen cars	821,739
Camden, N. J. Gloucester, N. J.	Public Service Railway	Construction of track and purchase of power house, substation equipment and thirty-three cars	1,240,780
Newport News, Va.	Newport News & Hampton Railway, Gas & Electric Company	Track extensions and purchase of ten cars	300,000
Add 10 per cent for contingencies and margin			\$5,457,519
Total appropriations under contract			\$6,014,270

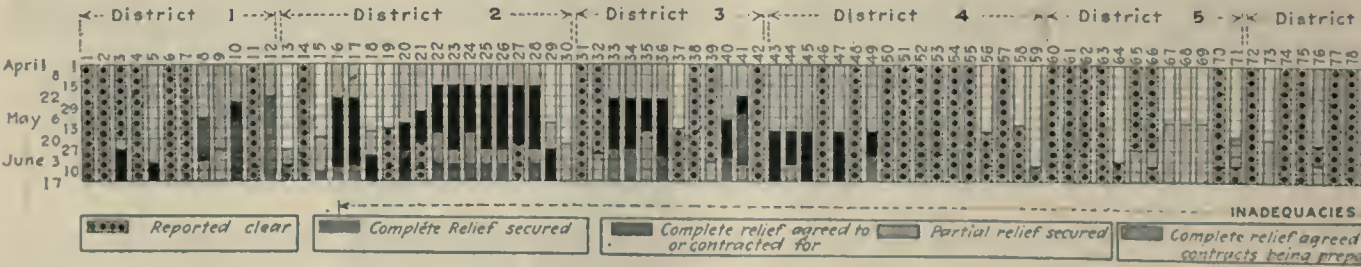
II, the division's appropriations to that date on behalf of the Emergency Fleet Corporation for new railway facilities, authorized under five contracts already signed, totaled \$6,014,270. Since then a contract for \$829,638 has been made in the case of the United Railways & Electric Company, Baltimore, Md.

Up to June the division had reached agreements or recommended additional appropriations in the case of ten other shipyards, the proposed facilities ranging from simple track extensions to track, power and car items. Moreover, the organization had under ad-

ministrations will not grow less in the near future. Table III, showing the past records of employment in representative shipyards and the estimated totals of employees at the end of the next six months, hardly indicates a declining tendency.

PRACTICAL RESULTS ACCOMPLISHED

References have been made in other issues of this journal to the physical improvements which individual electric railways have been enabled to make through the assistance of the Emergency Fleet Corporation, but



WEEKLY PROGRESS BEING MADE BY THE DIVISION OF PASSENGER TRANSPORTATION

visement the furnishing of additional cars for six industrial plants handling shipbuilding material and machinery, and it was considering expenditures for track, cars or power equipment in connection with sixteen shipyards. Still another item of expenditure is the amount which the Emergency Fleet Corporation may pay to shipyard workers who operate electric railway cars, in order to bring the railway wage scale up to the shipyard scale, as is already being done in the Staten Island (N. Y.) yards.

In view of the number of shipyards still under investigation and the probable further expansion of already examined shipyards so as to require added passenger transportation, it is evident that the \$6,014,270 of appropriations thus far made may be considerably increased during the coming year. Certainly the transportation work of the electric railways in the shipyard

is deemed advisable now to present a general outline of what has been accomplished throughout the country up to June 1. Take first the cases in which actual contracts had been made up to that time:

Hog Island.

Electric railway transportation to and from Hog Island, Pa., is supplied by the Philadelphia Rapid Transit Company via its Chester Short Line to a delivery loop at Ninety-fourth Street, Elmwood, about 1½ miles from the shipyard, the passengers being transferred at that point to a shuttle steam train. Additional electric railway facilities are supplied by the Philadelphia Railways, which operates a line from southeastern Philadelphia over the Penrose Ferry Bridge, the route passing Hog Island at a distance of about ½ mile.

Contracts have been executed covering the construction of a double-track branch from the Chester Short Line into the Hog Island shipyard and the purchase of 100 new cars to be operated by the Philadelphia Rapid Transit Company. In the case of the Philadelphia Railways, contracts have been executed covering rehabilitation in South Philadelphia, the construction of a double-track branch from the south end of the Penrose Ferry Bridge into the Hog Island shipyard, the purchase of thirty additional second-hand cars and the rehabilitation of certain existing cars. Thirty additional cars have

TABLE III—ESTIMATED INCREASES IN NUMBER OF SHIPYARD WORKERS

	Number of employees		
	Maximum in 1916	May 1918	Estimated in six months
Camden, N. J.	4,179	10,145	20,000
Newport News, Va.	6,955	9,175	17,300
Chester, Pa.	1,059	4,279	5,450
Quincy, Mass.	3,204	14,419	15,000
Sparrows Point, Md.	2,786	7,544	10,000
Baltimore, Md.	1,713	7,172	10,000
Seattle, Wash.	159	3,450	4,200
Staten Island, N. Y.	952	3,001	5,400
Shooters' Island, N. Y.	434	5,345	5,645
Jacksonville, Fla.	642	2,218	4,718

been ordered but these cars as yet have not been assigned to any particular company.

Port Newark.

Port Newark, N. J., is served by the Public Service Railway. Deficiencies in transportation there have consisted of the absence of direct street-car connection with the shipyard, resulting in dependence upon auto buses. Permanent additional transportation facilities are now under construction in the form of a 2-mile double-track extension of the Newark service by way of Doremus Avenue and Avenue R to the shipyard.

Camden and Gloucester, N. J.

The Public Service Railway also supplies service at Camden and Gloucester. Inadequacies were found to exist principally because of the shortage of cars and of men to operate them. The car shortage was due to the facts that eighteen cars had been lost by fire and that both shipyards started and stopped work at the same time.

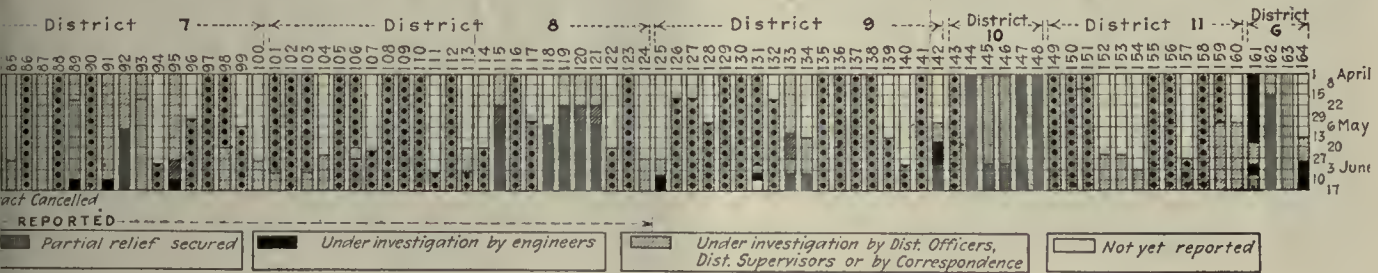
Immediate relief was obtained by staggering the times of starting and stopping by a difference of one hour. This expedient increased the number of rush-hour cars available for each plant from an average of ten to twenty-one cars, without any resort to new equipment. In addition, present and future requirements

on page 190 a summary of two formal agreements entered into by the Division of Passenger Transportation and Housing after this department was organized. The two Hog Island contracts and the Port Newark agreement were made before that time by another government agency. In order to give the latest information regarding contract terms, there is concluded a contract just entered into with the United Railways & Electric Company, Baltimore, Md. This is drawn along the lines of the later contracts mentioned above.

While some variations will be found to exist in the contracts summarized, the general terms are similar. The fundamental point is the furnishing of capital by the Emergency Fleet Corporation, with the railways paying interest thereon at 5 per cent. Operation of the new property is to be in the hands of the railways for at least the period of the war, and then the railways are to purchase the property at appraised values determined by boards of arbitrators, payment in most cases to be made in five annual installments.

OTHER IMPROVEMENTS ARE BEING PLANNED

As stated above, the Division of Passenger Transportation and Housing had, at the date of this review, reached understandings with local electric railways as to the transportation needs in ten other shipbuilding centers. While these understandings are subject to amend-



CLEARING UP RAILWAY DIFFICULTIES IN THE SHIPYARDS OF THE EMERGENCY FLEET CORPORATION

are being provided for by the purchase of thirty-three new cars and the installation of the necessary powerhouse, substation and line equipment, together with terminal loops at the shipyards.

Moreover, the site selected for the housing development at Camden and Gloucester requires the construction of a 1-mile single-track extension. The estimated cost of this proposed extension is \$210,000.

Newport News, Va.

Employees who do not live within walking distance of the shipyard at Newport News use the lines of the Newport News & Hampton Railway, Gas & Electric Company, which operates sixty-five cars in all. The lines extend $\frac{3}{4}$ mile north, 3 miles south and 11 miles east of the yard. The rush-hour conditions were found to be unsatisfactory, but under the contract made ten additional cars are to be purchased by the company.

The Emergency Fleet Corporation has authorized the construction of 500 houses at Hilton. A contract for the extension of the Huntington Avenue line to the proposed housing site, about 3 miles away, has been made.

HOW THE CONTRACTS RUN

For the benefit of operators who may be interested in the details of contracts between electric railways and the Emergency Fleet Corporation, there is inserted

ment before enactment into formal contracts, their general scope may be indicated as follows:

Essington and Chester, Pa.

Electric railway transportation for the shipyards at Chester and the Westinghouse Electric & Manufacturing Company at Essington is provided by the Southern Pennsylvania Traction Company and the Philadelphia Rapid Transit Company. Inadequacies exist principally by reason of the limited capacity of the single-track lines concerned, and the shortage of cars and car operators.

The construction of a second track paralleling the present single track of the Southern Pennsylvania Traction Company between Darby and Chester, and the purchase of twenty-two new cars, together with the necessary substation and line equipment, have been recommended. Thus adequate service will be provided between Chester and Darby and the territory adjacent thereto, from which the shipbuilding companies in Chester draw a considerable part of their labor.

The rehabilitation of the Wanamaker Avenue Line and the construction of a loop in Chester by the Philadelphia Rapid Transit Company has also been recommended to provide good local transportation for the Westinghouse plant and to provide accommodations for special cars to be operated for the shipyards at Chester.

Abstracts of Recent Contracts Made by Division of Passenger Transportation

CAMDEN AND GLOUCESTER

Public Service Corporation of New Jersey

Work To Be Done: Construction of two loops, together with power house, repair shop, substation apparatus and appurtenances, car shortage tracks and overhead electrical equipment. Thirty-three new cars are to be purchased.

Cost: Estimated cost is \$1,240,780, to be paid by the Emergency Fleet Corporation, whatever it may be.

Operation: Operation shall be under the control of the railway, but such priority shall be given to the transportation of shipyard employees as may be necessary to make service rendered them adequate to the demand.

Period of Operation: Duration of war and thereafter until notice of termination of operation is served by either party and until both parties have consented, in writing, to the appraisal figure hereafter provided for.

Interest: From commencement of operation to termination of operation, the railway shall pay interest at the rate of 5 per cent per annum on the actual cost.

Final Accounting: At termination of operation, the railway shall purchase all property (except the two loops, the estimated cost of which is \$60,295) at an appraisal figure to be determined by a board of three—one selected by each party, and these two to select a third. The Emergency Fleet Corporation shall have the option to retain any car or all cars.

Basis of Appraisal: "Reasonable worth and value to the railway for its own use or for the use of Public Service Electric Company as its lessee, or for sale after the termination of operation under this agreement."

Payment: Payment of the appraisal figure shall be made in five equal annual installments, the first installment to be due one year after termination of operation. Interest on balances due shall be 5 per cent per annum.

Security: Bond, guaranteeing performance of contract, to be executed by the Public Service Corporation, holding company for the railway, and title to all property to be retained by the Emergency Fleet Corporation until full purchase price is paid. If any part of principal sum or interest is in default for two months, the entire balance shall become due and payable.

NEWPORT NEWS

Newport News & Hampton Railway, Gas & Electric Company

Work To Be Done: A single-track extension of existing line into proposed village of "Hilton," with all necessary tracks, overhead construction and feeders, and purchase of ten new cars.

Cost: To be paid by Emergency Fleet Corporation, whatever it may be; estimated at \$300,000.

Operation: Operation of such extension is for the service and benefit of the shipyard and its employees; and preference shall be given to employees of the shipyard in so far as the railway has a lawful right to discriminate.

Period of Operation: Duration of war and thereafter until either party gives three months' notice of a desire to terminate the contract, and thereafter until the decision of arbitrators.

Interest: From commencement of operation to termination of operation, the railway shall pay 5 per cent interest per annum, payable semi-annually, on actual cost.

Final Accounting: At termination of operation the railway shall purchase all property, including the ten cars, at an appraisal figure to be determined by a board of three—one to be selected by each party, and these two to select a third. The Emergency Fleet Corporation may elect to retain six of the ten cars.

Basis of Appraisal: "Upon the then existing physical value provided, however, that in no event shall the appraisal figure for the construction work and four of the ten cars be less than \$175,000."

Payment: Payment of the appraisal figure shall be made in five equal annual installments, interest on balances due being payable semi-annually at the rate of 5 per cent per annum. The first installment shall be paid one year after the termination of operation.

Security: The Emergency Fleet Corporation shall retain title to the property, including the ten cars, until the principal sum together with the interest thereon is fully paid. If any part of the principal sum or the interest be in default for two months, the entire balance shall become due and payable.

BALTIMORE

United Railways & Electric Company

Work To Be Done: Purchase of fifty electric cars fully equipped for train operation and the construction of storage facilities and terminal loops.

Cost: To be paid by the Emergency Fleet Corporation, the contract amounting to \$829,633.

Operation: Operation is under lease, whereby the railway pays rent equal to 5 per cent on the purchase price of the cars. All maintenance and repairs are borne by the United Railways & Electric Company. The cars shall be devoted to the best interest of the Emergency Fleet Corporation as determined by it.

Period of Operation: Duration of the war and thereafter until both parties have consented in writing to the terms of purchase as provided for.

Interest: From commencement of operation until the termination of the lease, interest in the form of rent shall be paid at the rate of 5 per cent per annum on the actual cost.

Final Accounting: At the termination of the lease the Emergency Fleet Corporation shall have the election to sell all or any of the fifty cars to the company at a price not more than 100 per cent or less than 75 per cent of the actual cost to the corporation, the exact amount being determined by arbitrators, if so decided—one to be appointed by the company, one by the Emergency Fleet Corporation and the third by the two arbitrators thus chosen.

Basis of Appraisal: The appraisers shall determine (a) 75 per cent of the actual cost of the cars to the Emergency Fleet Corporation; (b) the value of each of the cars to the company; (c) the value of each of the cars for sale. The highest figure shall constitute the appraised value, which may not exceed 100 per cent.

Payment: Payment shall be made in five equal installments, of which the first shall become due one year after the termination of the war. Interest on all balances due shall be figured at 5 per cent.

Security: The Emergency Fleet Corporation shall retain title to all cars until the principal sum together with interest thereon is fully paid. If any part of the principal sum, or interest, be in default for one month, the entire balance shall become due and payable.

Various changes in routing of the Philadelphia Rapid Transit Company cars to provide quicker and cheaper transportation to the plants have been agreed upon.

Kearny, N. J.

Transportation at Kearny has been inadequate owing to the lack of cars and men on the part of the Public Service Railway, and to the inconvenient location of the station on the Jersey Central Railroad. Recommendations for relief include the rendering of additional tripper service by the Public Service Railway (ten cars), the changing of the location of the Jersey Central station and the bringing of the service of the Pennsylvania Railroad and the Hudson & Manhattan Railroad, transportation agencies heretofore not used, to the shipyards.

Quincy, Mass.

At Quincy the transportation facilities furnished by the Bay State Street Railway have been inadequate, resulting in dangerous overcrowding of cars. The difficulties have been lack of sufficient power to handle the morning and evening rush-hour traffic, inadequate track facilities over the Neponset bridge and insufficient cars. Some improvement has been accomplished through a flattening out of the morning and evening rush-hour periods by having some shipyard workers report for

work at 7 a.m. and some at 8 a.m., and having them quit work at 5 p.m. and 6 p.m. This plan gives better railway service, but it is unsatisfactory both to the men and to the shipyard management.

The plan now agreed upon to relieve the situation is to construct a transmission line for the purpose of increasing the power supply, by overhead construction or by conduit if the former is not allowed; to rehabilitate thirty-seven cars to permit train operation, and to widen the Neponset bridge to permit double-track operation.

Sparrows Point, Md.

The shipyard at Sparrows Point is served by the United Railways & Electric Company, but the present line is $\frac{1}{2}$ mile from the shipyard gate and there is a shortage of cars. Moreover, housing facilities are to be provided at St. Helena, and this requires an improvement in transportation facilities.

To meet the need the construction of a spur from the present line to the shipyard gate is under investigation. The Pennsylvania Railroad passenger tracks into the shipyard are to be shifted to the west, and the electric lines placed to the east of the main entrance. It is proposed to include sufficient storage tracks for an additional train on the Pennsylvania line and for storage of electric cars between rush hours.

Additional cars are on order and are being delivered to the electric railway.

Baltimore, Md.

The shipbuilding company at Baltimore has three yards. The upper yard, a small one located near Frost and Jackson Streets, has adequate transportation facilities. The lower and east yards are located at the end of Fort Avenue, the yard gates being opposite each other. Approximately 5000 employees are carried over the Carey Street line and the Hartford Avenue line of the United Railways & Electric Company to and from the shipyard gates, which form the eastern terminus of the line. Passengers are carried away in one direction only, and the cars are badly overcrowded. No loop is provided and the cars have to change ends.

Already the working hours of the two plants have been staggered so as to permit the use of tripper cars twice during each rush hour. Moreover, according to latest advices, the Baltimore case has just been covered by the drawing of a contract involving the expenditure of \$829,638 by the Emergency Fleet Corporation. Fifty cars fully equipped for train operation are to be purchased, and storage facilities and terminal loops constructed.

Curtis Bay, Md.

The Curtis Bay shipyard is served by one line of the United Railways & Electric Company, but the men have to walk a long distance from the end of the car line. The line was badly overcrowded during the last winter, and there was a shortage of power. The railway, however, is going to extend its line a distance of 1500 ft., which will bring it within 1/2 mile of the shipyard gate. The sidewalk from the end of the extension to the gate will be constructed, and additional car service will be provided.

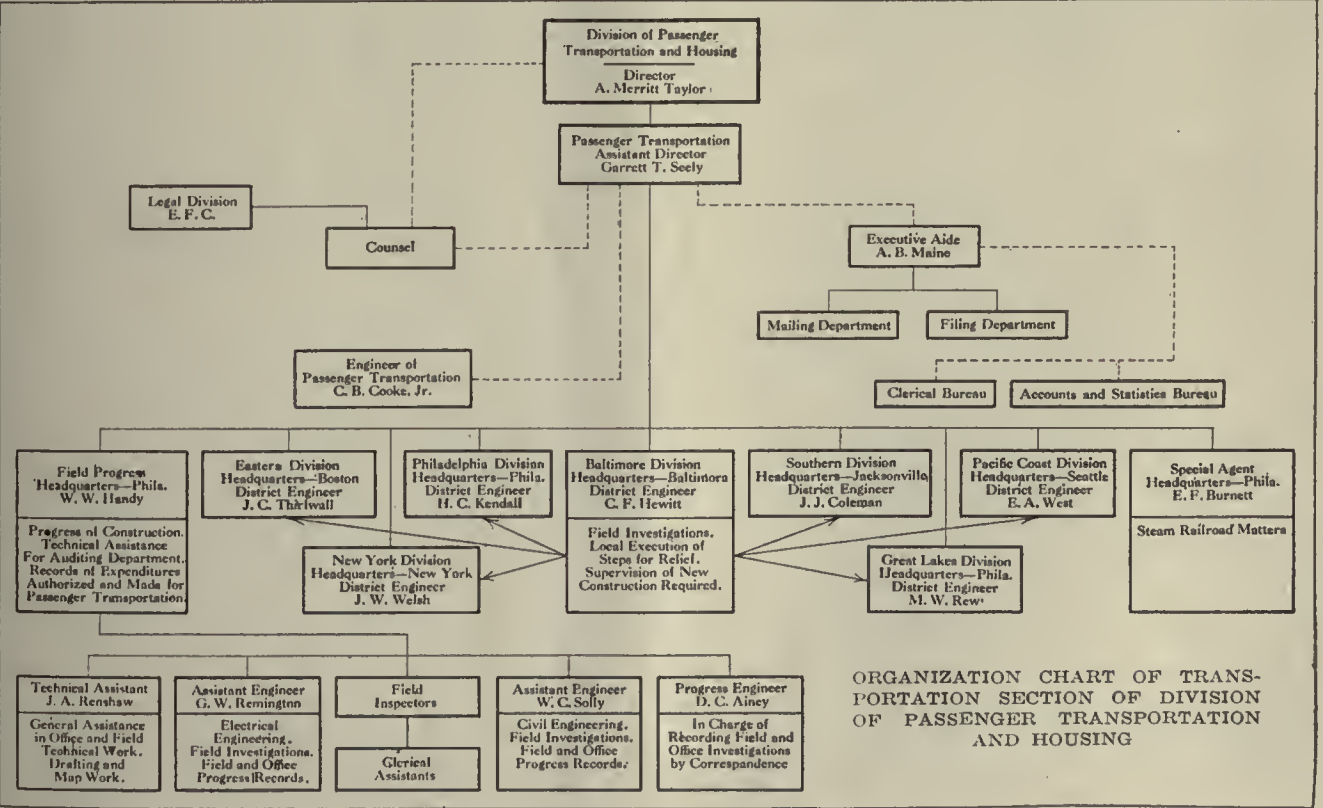
Seattle, Wash.

The shipyards in Seattle are served by the Puget Sound Traction, Light & Power Company, which lacks adequate track facilities to handle such service. A proposed extension of the electric lines has been under advisement. The Northern Pacific Railway, however, is operating steam service to the shipyards, and it is stated that the transportation facilities are now adequate.

Oakland, Cal.

About 85 per cent of the 6000 employees of the Oakland shipyard reside in territory served by the surface lines of the San Francisco-Oakland Terminal Railways. These men have to walk 2400 ft. from the shipyard gate to the Eighth Street line, from which they transfer to all parts of Oakland. More than 400 employees (mostly skilled workmen) walk about 2000 ft. from the shipyard gate to the Aldine Station of the Southern Pacific interurban electric line, connecting with the Southern Pacific ferry operating between the Oakland Mole and San Francisco. This service is adequate. Minor facilities are also afforded over the Twelfth Street line of the San Francisco-Oakland Terminal Railways and the Eighth Street line of this company to Alameda.

An extension of the line between Eighth Street and the shipyard, a distance of 2000 ft., has been agreed upon. A prepayment inclosure to be constructed at the end of the extension near the gate, to be used also for storage of cars during the non-rush hours. Additional service has been provided by the Southern Pacific electric interurban line from the Aldine Street station. The Webster Street drawbridge, crossing the Oakland Estuary, has been ordered closed during the rush hours. This affects service to employees living



in Alameda and using the surface lines of the San Francisco-Oakland Terminal Railways.

Staten Island, N. Y.

Electric railway transportation at the shipyards on Staten Island is dependent upon the Richmond Light & Railroad Company. The service has been inadequate owing to the distance of Staten Island from large sources of labor supply, requiring long trips by ferry or steamer, as well as to deficiencies in the local electric railway service.

Recommendations for immediate relief include the operation of twelve additional tripper cars, of summer type now available, for the local service. For permanent relief, twelve additional cars will be purchased. This service will be made more effective by means of terminal loading tracks at the shipyards, thereby permitting the use of a greater number of trippers without interfering with the regular service. Further relief is being arranged for by additional ferry service and the operation of special steamers from adjacent districts.

Fare Increases in Massachusetts

Twenty-four Companies Operating 92½ per Cent of Mileage Raised Their Fares

THE Public Service Commission of Massachusetts was established in 1913. Since that time, of the thirty-seven street railway companies operating in Massachusetts (exclusive of the Boston Elevated railway system, over whose rates the commission has no jurisdiction) having a total length of line of about 2050 miles, twenty-four companies representing 1900 miles of line have been allowed increases in rates of fare.

The following summary shows, as of Aug. 1, 1918, the companies granted increased rates, the length of line represented, the date of the commission's findings with the time taken for consideration in each case, together with a brief statement of the character of the increases which were granted:

Company	Length of Line (Miles)	Date	Commission's Decision
Bay State	762	Aug. 31, 1916	6-cent fare on country lines.
Bay State		Mar. 5, 1917	Reduced rate tickets in Fall River withdrawn.
Bay State		July 3, 1917	6-cent fare on city lines.
Bay State		June 11, 1918	6-cent cash fare within restricted inner zones on certain city lines with 2-cent additional cash fare to outer zone; by tickets to and from center, 5 cents and 7½ cents, respectively, with further reduced rate for off-peak travel. Zone system on interurban lines, with varying cash rates of 2 cents, 7½ cents and 3 cents per mile. Reduced-rate tickets withdrawn or modified.
Blue Hill	16	July 31, 1915	5-cent fare on part of line; additional zone established.
Blue Hill		June 15, 1918	7-cent fare on part of line.
Boston & Worcester	49	Sept. 22, 1917	Zone system 2 cents per mile.
Boston & Worcester		July 16, 1918	Increased to 2½ cents per mile.
Bristol & Norfolk	6	Aug. 31, 1916	6-cent fare.
Concord, Maynard & Hurlon	18	May 25, 1917	Zone system 2 cents per mile.
Concord, Maynard & Hurlon		Aug. 1, 1918	Increased to 3 cents per mile.
Connecticut Valley	45	April 16, 1918	Workmen's tickets withdrawn.
Connecticut Valley		July 6, 1918	Round-trip tickets withdrawn.
Holyoke	58	Dec. 31, 1917	5-cent cash fare in restricted inner and outer zone. 61-cent ticket rate between points located in both zones. 7-cent fare on branch line.
Massachusetts North-eastern	120	Oct. 14, 1916	6-cent fare.
Massachusetts North-eastern		June 29, 1918	5-cent unit; re-established with restricted additional zones.
Middlesex & Boston	106	Oct. 28, 1914	6-cent fare.

Increases in fares were pending on Aug. 1, 1918, upon the following street railways:

Name	Length of Line (Miles)	Hearing Closed	Tariff Effective	Character of Increase
Brockton & Plymouth	22	*	Aug. 15, 1918	7-cent fare.
East Taunton	11	July 16, 1918	.....	6-cent fare.
Interstate Consolidated	27	July 9, 1918	.....	Additional zones established.
Milford & Uxbridge	**	July 23, 1918	.....	7-cent fare on certain zones.
New Bedford & Onset	**	July 10, 1918	.....	7-cent fare.
Northern Massachusetts	**	*	Aug. 19, 1918	6-cent fare, additional zones at 3-cents per mile.
Total	60			
* Pending under tariff filing.				
** Previous increase allowed by commission.				

"As Necessary as Rails"

UNDER this caption, in a recent issue of *Tram-O-Grams*, J. C. Davidson, publicity manager Denver (Col.) Tramway, emphasized the great importance of publicity to electric railways. In his opinion, the money necessary for carrying on this great work is an expense that is looked upon by the leaders of this industry as an economical means of curtailing vast expenditures. In other words, it prevents misunderstandings which might lead to a long drawn-out series of small outlays in the end totaling sums of tremendous proportions.

Electric railways in nearly all large cities, says Mr. Davidson, are waking up to the full realization of the usefulness of wide publicity on matters relating to their work. To his mind, *Tram-O-Grams* and the newspaper campaigns used in Denver are fairly good illustrations of what may be accomplished by presenting the facts in a truthful and straightforward manner to the people, throwing light on subjects that heretofore have been a closed book, drawing criticism about matters little understood and answering them satisfactorily.

The Denver company feels that its patrons have come to realize that the company has no desire to profit at the expense of good-will.

Company	Length of Line (Miles)	Date	Commission's Decision
Middlesex & Boston	....	Aug. 10, 1917	Certain lines increased to 7 and 8 cents.
Middlesex & Boston	....	June 29, 1918	6-cent lines increased to 7 cents; 1-cent for transfer on certain lines. Reduced-rate tickets withdrawn.
Milford & Uxbridge	53	Aug. 9, 1917	6-cent fare.
Milford, Attleboro & Woonsocket	28	July 15, 1918	7-cent fare.
New Bedford & Onset	37	Sept. 8, 1915	6-cent fare.
New Bedford & Onset	..	Aug. 24, 1917	Reduced-rate tickets withdrawn.
Norfolk & Bristol	20	Aug. 19, 1915	6-cent fare.
Norfolk & Bristol	..	June 29, 1918	7-cent fare.
Northampton	24	June 29, 1918	Additional zones.
Northern Massachusetts	45	April 30, 1918	Zone system 2 cents per mile.
Norton, Taunton & Attleboro	19	Aug. 30, 1917	6-cent fare.
Norwood, Canton & Sharon	6	May 2, 1917	7-cent fare.
Providence & Fall River (Swansea & Seekonk)	10	Mar. 13, 1914	6-cent fare.
Springfield	141	Mar. 30, 1918	5-cent cash fare in restricted inner and in outer zone. 61-cent ticket rate between points located in both zones not more than 5 miles distant; 81-cent ticket rate beyond 5 miles.
Taunton & Pawtucket	17	Jan. 11, 1918	7-cent fare.
Union	42	Aug. 20, 1917	* Monthly commutation tickets withdrawn.
Ware & Brookfield	11	Mar. 29, 1917	7-cent fare.
Worcester Consolidated	250	July 1, 1918	6-cent fare.
Worcester & Warren	19	Mar. 30, 1917	7-cent fare.
Worcester & Warren	19	Dec. 15, 1917	10-cent fare.

Total 1,902 miles

* Allowed under tariff filing without formal proceedings.

A. E. R. A. War Board Submits Brief on One-Man Cars

National War Labor Board Informed of Improvements in Service, Stimulation of Travel and Decrease in Energy and Labor Due to Modern One-Man Cars

IN ACCORDANCE with the request of the National War Labor Board a brief on the development of modern one-man cars was presented to that body on July 26 by the War Board of the American Electric Railway Association. The data for the brief were compiled for the War Board by J. F. Layng, railway department General Electric Company, and Walter Jackson, business manager *ELECTRIC RAILWAY JOURNAL*. The situation on the one-man car is set forth as follows:

THE USE OF ONE-MAN CARS WITH AUTOMATIC EQUIPMENT

Beginning with the year 1914, the increasing incursions of the private automobile and the coming of unregulated jitney competition led railway engineers and operators to design a car which could be safely and economically operated with one man at the shorter intervals necessary to regain and even to create street railway travel. The need for such a car has since been accentuated by enormous increases in all operating costs and by the scarcity of platform labor, owing to the large number of men who have gone into war or war industries. Thus the average operating ratio has risen from 58 per cent in 1912 to 72 per cent in February, 1918.

At the present writing some 700 of the modern one-man cars hereinafter described have been built, and it is estimated that at least 30,000 could be applied advantageously. Inasmuch as the term "one-man" car has been loosely construed, it is well to define the types that pass under that name.

The term "one-man" car is applied to any car on which one man acts as conductor and motorman. There may be the widest difference, however, in the kind of service and in the character of the equipment.

The oldest application of one-man cars is for stub-end or shuttle service in suburbs where travel is light. In such cases, the car differs only from the usual two-man car in the locking of the rear platform to prevent unauthorized ingress and egress. Such operation is of little importance in saving man-power since the mileage of shuttle cars is less than 1 per cent of the total. It is a service which is given merely to permit access to other lines.

A somewhat wider application of the one-man car is its use on complete routes with light traffic calling for headways of say fifteen to thirty minutes between cars. For such service it is desirable to have a more attractive car than for shuttle service and also to use labor-saving equipment, such as air brakes. Several hundred cars are now operated as one-man cars under such limitations.

But by far the widest application of the one-man car is in cities where downtown congestion does not demand

the largest possible passenger capacity per unit or where such congestion could be overcome by rerouting part of the traffic. Such application has already been proved feasible in cities up to 400,000 population and with car intervals of thirty-five to forty seconds through the use of the safety or automatic type of one-man car. It has been proved that because of the thoroughgoing substitution of automatic equipment for manual labor, this car can readily be handled by one man.

New safety one-man cars seat twenty-nine to thirty-five passengers each, or about three-fourths the usual capacity of two-man cars. In practice, however, it is customary to operate 25 to 50 per cent more units than of the larger cars so that the frequency of service and the number of seats offered are substantially increased with say two-thirds the number of men. These cars weigh less than 400 lb. per seat, whereas the displaced cars weigh 700 to 1200 lb. per seat. This reduction in weight means a proportionate reduction in coal. Most of these cars economize coal still further through the use of anti-friction bearings.

The term "safety" may also be applied to cars rebuilt for one-man operation by being equipped with the same group of automatic appliances. These cars are just as valuable for the saving of platform personnel but they are not so economical in fuel, naturally, as the newer, lighter cars.

The safety equipment is a combination of air brakes, air-operated doors, air sanders and the deadman's handle of the electric controller. These equipments so inter-act automatically that:

1. The doors will not open until the car has come to a full stop.
2. The car will not start until the doors are closed.
3. The power will go off, the brakes will apply instantaneously, and the tracks will be sanded the moment the operator of a moving car fails to bear down on the controller handle of the deadman type.

The saving in manual labor may be appreciated from one item alone, that of air operation of doors. A car which makes eight stops per mile, requires one opening and one closing movement each time. At a schedule speed of 9 m.p.h., this means $9 \times 8 \times 2$ or 144 door operations in one hour or 1440 door operations in ten hours. The air brake gives a like saving in manual labor, and, as all operations on a one-man car are concentrated at the front platform, the labor of reaching up to pull bell signal and fare register cords is also eliminated.

The best proof that safety cars need only one man is presented by the fact that nearly always these cars are making better, faster schedules than the two-man cars which they replaced. If the one-man car was appreciably slower, the railways would abandon its use because the loss in mileage, the slowing up of the service and

the increased liability of congestion would wipe out any saving due to smaller personnel. The superiority of the safety car for certain classes of service, as based upon actual operation, was first set forth in the *ELECTRIC RAILWAY JOURNAL* for Sept. 22, 1917, in a series of articles which have been accepted as authoritative not only by the operating companies but also by the public service commissions of many states. This superiority of the "safety" car is confirmed for a still wider range of service by the following memoranda made by the same transportation analyst who prepared the earlier survey. These later figures, covering ten cities ranging in population from 21,000 to 400,000, should prove conclusively that one-man safety cars are amply able to meet a wide range of operating conditions, and that if they were applied wherever possible there would be a saving of hundreds of thousands of tons of coal annually and a saving in men of vigorous physique equivalent to at least one division of the United States Army!

Columbus, Ga.—Population 21,000

One-man service was begun on April 15, 1918, on a 6-mile belt line which serves rich and poor, white and colored. This change has proved so satisfactory that the company cannot get more cars fast enough to satisfy the riders on other lines. The cars make the round trip in thirty-six minutes instead of forty; they take 1 kw.-hr. per car-mile instead of 2.3 kw.-hr. per car-mile, or in terms of coal they use 3 lb. of coal per mile instead of 6.9 lb. of coal per mile. Actually, less power is now used to run cars every twelve minutes than when cars were run every twenty minutes. The greatly improved service is given with nine men instead of twelve.

Tampa, Fla.—Population 37,000

One-man car service was begun Jan. 10, 1918, on the Michigan-Hyde Park crosstown line, 12.22 miles round-trip length. It is the most representative line in Tampa, since it carries Latin cigarmakers, negroes, white, etc. The people were accustomed to open cars which they could board at any point, often while the car was in motion. In one day they were asked to change to front-entrance, prepayment closed cars which cannot be left or boarded under normal conditions while the car is in motion. The change was a success. The old schedule speed of 8.6 m.p.h. was raised to 9.2 m.p.h., an increase of 7 per cent; fifteen and ten-minute intervals were replaced by ten and seven-and-one-half-minute intervals with a consequent increase in riding of 15 to 20 per cent. The coal requirements per car are less than half of the old 15-ton cars. The desire of the public to co-operate is also evident from the fact that 75 per cent of the passengers tender exact fare. Twenty men are now giving 30 per cent more service to the public than was formerly given with thirty men.

Beaumont, Tex.—Population 50,000

Two-man service on light cars without the safety devices was begun in 1916. Experience indicated that the safety devices should be applied in order to make better schedules and easier working conditions for one-man service. The fourteen cars on hand have just been converted to the safety type. According to latest advices the railway plans to give 50 per cent more service with fewer men than before.

Houston, Tex.—Population 120,000

One-man car service was begun on June 2, 1918, on the Woodland Heights line, which has a round-trip length of 9.53 miles. One mile is the most congested part of the city where the interval between cars is as short as forty seconds. The cars make the round trip in sixty minutes instead of seventy minutes, and this combined with a 33½ per cent to 50 per cent increase in service has enlarged travel more than 52 per cent. The headway on the Woodland line alone is as low as four minutes. The extraordinary increase in service noted has been obtained with approximately two-thirds the former number of platform men.

Fort Worth, Tex.—Population with Soldiers 100,000

Fort Worth was the first to demonstrate the ability of the safety car, beginning on the Summit Avenue line on Nov. 1, 1916. On Oct. 1, 1917, four more lines were added. On the Summit Avenue line the schedule speed had been raised 12½ per cent so that a round trip of 6.6 miles could be made in forty instead of forty-five minutes. The average increase in service was 50 per cent and the increase in riding about 20 per cent.

During the past year, Fort Worth has enjoyed the extraordinary increase of 25 to 40 per cent in traffic throughout owing to the presence of Camp Bowie. The remarkable thing is that the one-man cars have absorbed this unexpectedly large increase without suffering in schedule speed or causing a demand for additional cars. At present an increase of more than 50 per cent in travel is handled with 108 instead of 150 man-hours a day.

Of the new lines, it may be pointed out that the East Front-Samuels line, 6 miles round trip, has to run over twenty-four busy blocks. Nevertheless this line has the same schedule as before, although three safety one-man cars are carrying 50 per cent more riders than three two-man cars did, employing fifty-six instead of 107 man-hours. The Henderson-West Weatherford line with nearly 100 per cent increase in travel maintains the old schedule speed of 9.9 m.p.h. and uses 121 instead of 142 man-hours; the St. Louis Avenue line is run at the high schedule speed of 10.2 m.p.h. and it uses fifty-six instead of 110 man-hours to handle 25 per cent more travel; the Forest Park line has reduced its man-hours from seventy-six to thirty-nine.

In view of the extraordinarily heavy traffic at Fort Worth, it is significant that step and platform accidents on these cars have been practically nil.

El Paso, Tex.—Population with Soldiers 100,000

On Feb. 14, 1918, the Washington Park line, 6½ miles round trip, was opened with about 15 per cent increase in mileage. The schedule speed was raised from 9.25 to 10.1 m.p.h. Travel has increased 35 per cent while ten men have been replaced by six. Power requirements are now 1 kw.-hr. instead of 1.8 kw.-hr. per car-mile. The Sunset line shows similar results, four men handling 40 per cent more travel than eight men did before.

Tacoma, Wash.—Population 100,000

In 1917, the company began to operate old cars with safety equipments, but for all-day use these have since been replaced by new light cars on four lines which operate downtown. The Portland Avenue line, started on Dec. 7, 1917, is giving 15.4 per cent more mileage

and carrying 26.2 per cent more passengers (all comparisons are of May, 1918, and May, 1917). The Sixth Avenue line, started on Jan. 28, 1918, with an individual headway as low as three and one-half minutes, is giving 69.6 per cent more mileage and carrying 55 per cent more passengers. The Old Tacoma line, started on Nov. 19, 1917, is giving 36.8 per cent more mileage and carrying 28.3 per cent more passengers.

Seattle, Wash.—Population 400,000

Seattle is the largest city operating one-man safety cars in the congested section. Thus the Summit Avenue line operates in with overlapping lines having a headway as low as thirty-five seconds. This line was completely equipped by June 27, 1918. The round trip of 4.9 miles is made in forty-two minutes. The service has been increased 66 per cent and the patronage 59 per cent with less power and fewer men than before. In this city the men did not believe that the cars could be operated readily by one man. The company agreed to let them go out with two, but at the end of a week the men stated that they were satisfied that the cars could be operated with one man; and they have been operated with one man per car ever since.

Everett, Wash.—Population 25,000

All city service is now handled with one-man cars. The service has been increased by 35 to 50 per cent, the cars operated increased from thirteen to eighteen, the traffic increased almost 50 per cent, the average energy per car-mile reduced from 3.34 kw.-hr. to 1.91 kw.-hr. and the platform personnel reduced by 25 per cent or more.

Bellingham, Wash.—Population 37,000

This city has also been converted completely to safety car operation. Coincident with a reduction of energy requirements from 214,300 kw.-hr. in May, 1916, to 155,000 kw.-hr. in May, 1918, the car-miles rose from 73,382 to 94,118 and the patronage from 321,284 passengers to 400,239 passengers. The number of operatives has been lowered from seventy-five to forty-nine.

SUMMARY

In general these definite points may be brought out from the foregoing data:

1. That the one-man safety car is applicable to a wide range of electric railway conditions.
2. That the safety cars of new construction permit enormous savings in fuel.
3. That all safety cars permit greatly increased service to the public, while still permitting a large reduction in platform personnel.
4. That the safety car, because of the use of automatic devices, can be operated at a higher schedule speed by one man than an older-style car can be operated by two men.
5. That the safety car fully justifies its name as a preventer of accidents through the inter-operation of control, brakes, doors, steps, sander and emergency brake.
6. That only the safety car's economies in operation and improvements in service have made it financially practicable to maintain railway service in small cities where short headways were a necessity and in larger cities where the shortage of labor has seriously im-

paired the ability to give adequate service even with but one man per car, as at Seattle and Tacoma.

7. That the safety car is preferred by the men themselves because it eliminates all manual labor and avoids division of responsibility with a second platform man.

8. That the safety car promotes better public relations in demonstrating the good-will of the railway, thereby paving the way for a solution of the local utility problems.

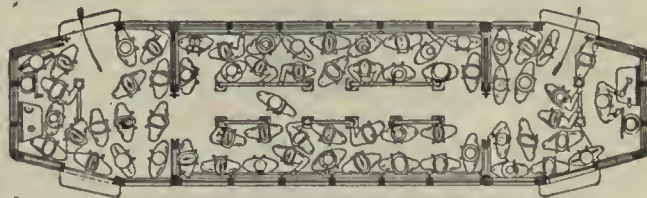
It may be of interest to add that as these modern cars now cost about \$6,700 each, the probability that electric railways can order them in large quantities is remote if operating costs should rise sufficiently to absorb in advance the increased revenues that these cars might bring.

In conclusion, it is respectfully pointed out that the rate of change or turnover of platform men is so great that no man has ever been deprived of work on the properties named because of the introduction of the one-man car. The railways hope, in fact, that the elimination of manual labor on these cars will enable them to offer employment to a wider classification of men and to keep such men longer in the service.

Seatless Car Being Tried in Rome

ON SOME of its routes the Rome (Italy) Tramways is experimenting with a number of seatless motor and trailer single-truck cars. These cars, as shown by the accompanying loading diagram, are of the inclosed type with bowed ends, and they accommodate as many as sixty-five passengers.

Passengers enter at the rear and descend at the front, both on the near side. The rear platform accommo-



ARRANGEMENT OF PASSENGERS IN SEATLESS-CAR
BEING TRIED IN ROME, ITALY

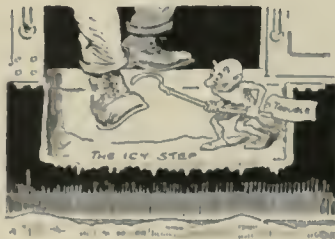
dates seventeen persons, and the front one only thirteen, a space being chained off for the motorman. In the body of the car, separated by a series of hand rails, are three parallel longitudinal aisles. The center one is kept free for fare collection and passenger circulation.

The new cars are clearly marked on the vestibules at each end: "Standing Places Only." The company plans to try them for six months and watch the economic and social results. If there is no serious objection, the public authorities will permit the continuance of the seatless-car service and its extension as traffic demands require.

On July 1, 670 officers and employees of H. M. Byllesby & Company and affiliated companies were engaged in the military service of the United States or Allies. This represents 13.8 per cent of all male employees of the organization. There are now four gold stars in the Byllesby service flag.

Some Typical Posters of the National Safety Council Prepared Under the Auspices of the Electric Railway Section

Ice = Treacherous



KEEP THE CAR STEPS AND PLATFORMS FREE FROM ICE

Begin early with the fall of snow to sweep them clean. If the packed-down snow and ice gets ahead of you, are a very little hand to overcome the danger of passengers slipping. If left on icy car steps and platforms may easily result seriously, perhaps fatally.

It's Human Nature to Forget One's Awkwardness and Blame the Ice Entirely
Don't Give Passengers a Chance for Complaint of This Kind Against You

CURVES



Irate Passenger (at the complaint window)—

"I have been riding home every evening with motorman No. 672. He has the curves at 40 miles. Last night he threw an old lady from her seat at the bend. The night before two children, standing, were thrown down violently. The rest of us feel like huns. I am tired of being

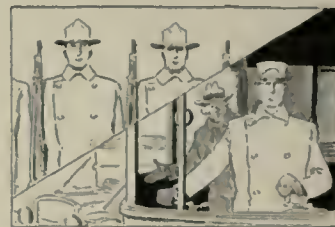
"Tied in a Knot Every Evening"

Fall-in-Car Accidents are difficult to handle because the trainmen very often do not know they occur and cannot report them.

DON'T CAUSE SUCH ACCIDENTS

BY IMPROPER OPERATION AROUND CURVES

ATTENTION!



Squad Attention!

Brings each soldier's thought to that point of alertness where he is always ready to execute the simplest to the most difficult movement.

Motorman Attention!

To the important duty of operating your car with safety.

It's the BIG COMMAND of YOUR JOB—and ALERTNESS ANSWERS ITS REQUIREMENTS

Let Not the Rabble of the Thoughtless Passenger Dull Your Mind to Your Duties

And make you responsible for personal injury to pedestrians or driver

Send Your Valentines After The Day's Work Is Done



Your heart may be full in overflowing with sentiment, longing for expression in the form of a sweet-scented missive to **H.E.**

But Don't Jeopardize the Lives of Persons Boarding Your Car by Inattention to Duty

THE ROUGH MOTORMAN



He slaps on the "juice," he slams on the air, He hurls the stress of the strap-hanger there.

If his passengers could have their wish, the "rough" motorman's sleep would be continually haunted by the spectre of his misdeeds.

He Shakes Up Their Bones

at Every Start and Stop of the Car

Many accidents are charged up to him—aged and infirm people, women and children are thrown and sometimes seriously injured.

Don't Join the Rough Motormen's Class

Start and Stop Your Car Smoothly and Easily

KNOCK YOUR FRIEND



Knock Your Friend—The Gong!

It's the best friend the motorman has and, unlike all other friends, doesn't object in the least to the knocking. The gong is on your car for

YOU TO USE

Don't Be Afraid to Wear Out a Little Shoe Leather on It

THE SPEED MANIAC



His Creed—Save a Second Whatever the Cost

Collisions between street cars and automobiles are increasing at an alarming rate but investigations show that nearly always the fault lies with the drivers and not with the trainmen. The streetcar company is not to blame, but all such cases are more or less troublesome and expensive. More than that

TOO MANY LIVES ARE ENDANGERED

Do More Than Your Share—Keep An Eye Open At All Street Intersections for the Reckless Driver
Avoid Accidents—It Helps Your Record

THE SPRING-FEVER BUG



Its Sting Is Almost Irresistible

The Spring-Fever Bug Takes Your Mind from Your Work and Accidents Happen

After the long winter months of fighting snow and slush and ice, listening to hicks from chilled passengers and to overworked old gentlemen complaining about the service—when the spring days come they are irresistible in fact.

Give ear to the call of the fresh green of the earth, to the bright sunshine, to the song of the birds. Take down the rusty rod, dig a few worms—and off to do fishing hole.

The Tonic of the Day Off

Will Make You a Safer Street Car Man

THE VACANT SEAT



"THE LITTLE GIRL WHO SAT THERE WAS KILLED BY AN AUTOMOBILE LAST WEEK"

The rules require that you operate your car with extra caution when approaching and passing schools; you are responsible, in large measure, for the safety of the children. What do the few seconds lost here amount to in comparison with the injuries which might result in a street car accident?

Operate Your Car Past Schools

As if the Safety of Your Own Children Were Involved

Don't Be Responsible for a Vacant Seat

Public Service Says Living Wage Is \$1,115

Company Avers Present Hourly Rates of 35 and 40 Cents Permit Adequate Living Standard—Says Working Conditions Are as Nearly Perfect as Demands of Operation Permit

THAT the demands of electric railway employees for a wage of 60 cents an hour are unwarranted in order to give them a living wage is the position taken by the Public Service Railway, Newark, N. J., in its pending case before the War Labor Board. The company calculates that average annual earnings of \$1,115 will give its trainmen their customary standard of living, even in this period of high prices, and that under the present reasonable working conditions this earning power is assured by the existing rates of pay of 35 cents (to end of fifth year) and 40 cents (thereafter) an hour.

WORKING CONDITIONS ARE FAVORABLE

In its brief the company asserts that working conditions are at least as favorable as on any electric railway and are as nearly perfect as the exigencies of operation permit. The runs are constructed to provide as nearly as possible a ten-hour working period. This, it is said, has been considered the desirable working period for the industry, and it is necessary because of the peculiar characteristics of the business.

The company denies that the hours of work of trainmen are spread over excessive periods of time. The spread periods for all runs of nine hours or more are indicated in the following tabulation:

	Number	Per Cent
Total number of runs paying nine hours or over.....	1531	100.0
Number of runs finishing within twelve hours.....	694	45.3
Number of runs finishing between twelve and thirteen hours...	504	32.9
Number of runs finishing between thirteen and fourteen hours...	294	19.2
Number of runs finishing between fourteen and fifteen hours...	39	2.6

Thus out of a total of 1531 runs, 45 per cent or 694 conclude the day's work within a twelve-hour period. A total of 1198 or 78.2 per cent have work spread over thirteen hours, and 1492 or 97.4 per cent over fourteen hours. Less than 3 per cent go beyond fourteen hours, while the maximum spread time is fourteen and a half hours.

The brief directs attention to the fact that the Boston Elevated Railway, operating under agreement with the Amalgamated Association of Street & Electric Railway Employees and in compliance with a nine-in-eleven-hour law effective in Massachusetts, has 27.5 per cent of total runs concluding in a period of more than thirteen and less than fourteen hours, whereas the Public Service Railway has but 19.2 per cent in this

period and 2.6 per cent in the fourteen-to-fifteen-hour period. In connection with these results, there should be considered the great number of trippers operated on the Boston Elevated Railway lines as against the negligible quantity in New Jersey.

Under the ten-in-eleven-hour plan suggested by the Public Service Railway employees, an addition of 31 per cent or 1071 men would be required to maintain the service. The cost to the company would be \$370,344 annually, if the reduction in spread time were practicable.

Table I is an exhibit for nine typical lines, showing results under the present spread of time and the rearrangement of runs that would be required if the company attempted to meet the ten-hours-in-eleven-demand. The change would require an increase from 293 crews to 372 crews, an addition of seventy-nine crews or 27 per cent.

With reference to other working conditions the company submits that:

1. Pay for waiting time for extra men is already covered in the amount of guarantee paid them of \$17.50 per week, which assures each man adequate recompense for any time that may be spent at rollcalls when work is not provided.

2. The institution of an additional amount for waiting time would permit of abuses and would be a constant source of friction and dissatisfaction.

3. It would bring about double payment to the men in many cases and would make it necessary to reduce the number of men carried as extras.

4. The amount of waiting time is really negligible under present conditions.

5. The present weekly guarantee is adequate for the service rendered and assures the trainmen a better minimum wage than obtains on other comparable railway systems, even those operating under agreements with the union.

6. Overtime as now defined on the property is the period during which a trainman works voluntarily after he has concluded his scheduled run. The prevailing rate includes an allowance of 5 cents an hour over the regular rate. The demand that overtime "be all work performed or waiting under orders to work in excess of ten hours" is impracticable and discriminatory.

In short, the company states that this is no time to alter conditions that were found satisfactory before the war. The changes now suggested would result in reducing production and artificially increase the cost of service, contrary to the policies and principles of the National War Labor Board and the best interests of the country.

PRESENT RATES GIVE ADEQUATE LIVING WAGE

The wage rates in effect prior to June 1 were 28 to 34 cents an hour, the maximum being reached at the end of the tenth year. On June 6 a new schedule became effective, providing for 30 cents an hour during the first six months, 35 cents an hour to the end of the fifth year and 40 cents an hour thereafter. The reason for the probationary period is the unsteadiness of work on the part of the less experienced and usually younger and single men.

In introducing the discussion of wages, the brief lays weight upon the point that trainmen are not skilled

TABLE I—RESULTS OF PROPOSED CHANGE OF SPREAD TIME ON NINE TYPICAL LINES OF PUBLIC SERVICE RAILWAY

	Present Spread Time	Proposed Ten Hours in Eleven
General average pay per day per man @ 30 cents.....	\$2.87	\$2.25
General average pay per day per man @ 35 cents.....	3.34	2.62
General average pay per day per man @ 40 cents.....	3.82	2.99
Number of crews on full runs.....	266	217

This means that forty-nine crews or ninety-eight men, representing 18 per cent of the crews at present working full paid runs, would be forced on the extra list and have to work trippers.

Number of crews on trippers.....	27	155
Additional crews of trippers under proposed plan.....		128
Total crews now required.....	266 plus 27	= 293
Total crews required in ten in eleven hours.....	217 plus 155	= 372

This is an increase of seventy-nine, or 27 per cent.

mechanics. It cites the finding in the bulletin "Street Railway Employment in the United States," published in April, 1917, by the Bureau of Labor Statistics, Department of Labor, to the effect that the occupation of conductors is "semi-clerical in some respects and one of responsibility rather than skill," and that the work of motormen is "easily learned and should be classed as a responsible rather than a skillful occupation."

These statements are confirmed by an examination of 500 platform men selected at random from employees hired in 1916, 1917 and 1918. More than 50 per cent of the 500 trainmen were recruited from three occupations—laborers, teamsters and clerks. Almost a fourth of the platform men were ordinary laborers before entering the employ of the company. With few exceptions these men were unskilled workers, commanding wages at the bottom of the industrial scale.

In order to show clearly the relative situation of trainmen and men of like ability employed in other industries in the territory the company investigated various enterprises around Newark. The results are shown in Fig. 1. Whereas the average income of the trainmen was in excess of \$1,046 a year, few employees of the four concerns included earned this amount. The classes of labor from which trainmen are recruited—namely, laborers, drivers and clerks—did not in any case earn the amounts paid to trainmen in 1917. While skilled mechanics, such as tool makers, foremen, pattern makers, lathe hands or masons earned more in 1917 than did the trainmen, the excess amounts were not large.

A comparison of the wage rates per hour paid to trainmen in 1917 with the hourly rates paid to the

men are adequate to attract and hold a sufficient number of men and women to meet operating needs. Fig. 2 shows the number of applications and appointments for the position of conductor from January, 1914, to June, 1918. The number of applications has always largely exceeded the number of men appointed. Moreover, out of 765 men hired as trainmen between June 1 and July 3, 221 or more than 28 per cent were former trainmen.

MONEY COST OF LIVING STANDARD

On the basis of investigations into the cost of living in Philadelphia and New York in 1917, the company concludes that a family income of from \$1,200 to \$1,400 a year is required. It directs attention to the fact, how-

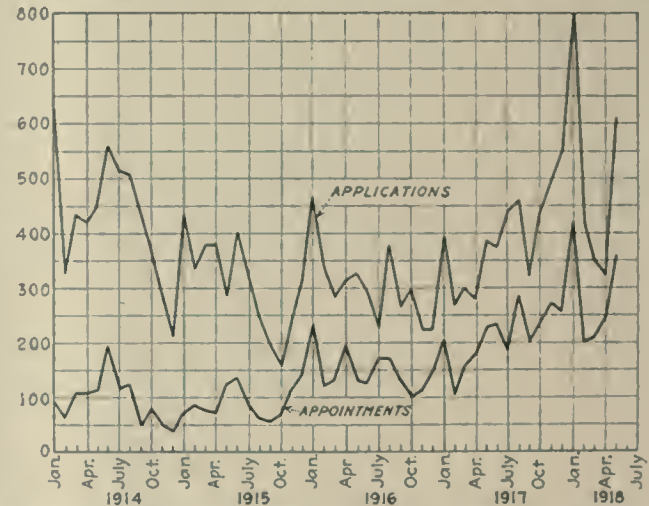


FIG. 2—RELATIONSHIP OF APPLICATIONS AND APPOINTMENTS FOR PUBLIC SERVICE RAILWAY CONDUCTORS

ever, that in adjusting such estimates to local cases due regard should be given to the composition of the family group (as compared to the standard of five members), to complementary family earnings and to the value of welfare and compensation provisions made by the employer.

The company made a census on July 6 to obtain accurate statistics as to size of family, earnings, etc., covering 90 per cent of the platform men. The average household for the married men, it was found, consists of 3.86 members. A readjustment of the \$1,500 standard for five family members, suggested in the April, 1918, Monthly Review of the Bureau of Labor Statistics, upon this and the other points gives the following:

Standard for family of five†	\$1,500.00
Allowance for smaller family	\$156.75
Allowance for complementary family earnings*	210.00
Minimum allowance for welfare and pension plans	17.81
Adequate annual earnings per trainman	\$1,115.44

†This figure, the brief states, was based on statistics covering other sections of this country and Canada, in which living costs are higher than in New Jersey.
*Railway census showed average annual complementary earnings of family to be \$156 or 14.9 per cent of the average earnings of trainmen.

In 1917, when the wage rates ranged from 25 to 32 cents prior to Oct. 1, and 28 to 34 cents after Oct. 1, trainmen earned the following average amounts: (a) Men now in 35-cent service group, \$827; (b) Men now in 40-cent service group, \$1,140. These averages are determined from reports made by the company to the collector of internal revenue.

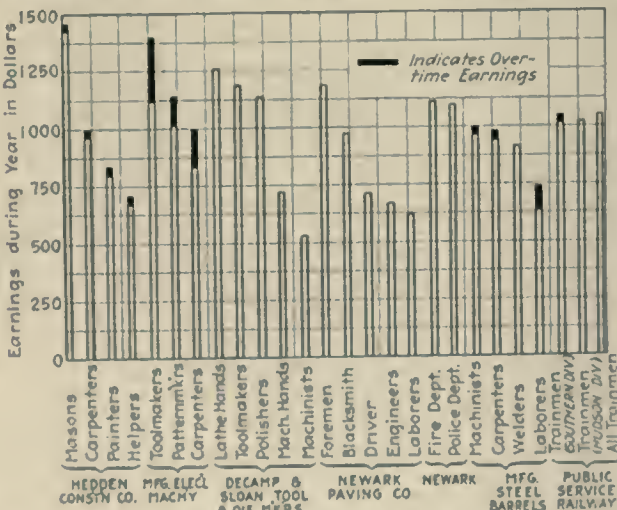


FIG. 1—EARNINGS OF PUBLIC SERVICE RAILWAY TRAINMEN IN 1917 COMPARED WITH THOSE OF OTHER WORKERS IN SAME LOCALITY

classes of labor covered in the above-mentioned diagram is said to be unfavorable to the railway. In almost every case the hourly rate in other industries exceeds that of trainmen, but if an examination is made of aggregate hours of employment of these workers in the course of a year, it will be found that the advantages of the hourly rate are entirely offset. The trainmen averaged more than 3000 hours in 1917. Very few classes of employees in other industries enjoy such great regularity of employment.

In the company's opinion, the present wages of train-

By applying the rates of 35 and 40 cents an hour to the actual number of hours worked by each man during 1917 and striking an average for each group, the earnings of trainmen in each group during 1918 are determined as follows: (a) Trainmen receiving 35 cents an hour would receive \$1,237; (b) Trainmen receiving 40 cents an hour would earn \$1,414.

Thus trainmen in the 35-cent group would receive about \$122 more than is necessary to insure their subsistence and that of their families in health and reasonable comfort. Trainmen in the 40-cent group would receive about \$300 in excess of the sum necessary.

In 1917, in divisions of the company where savings clubs were in operation, 62 per cent of the total trainmen were depositors, as compared to 54 per cent in 1914, 56 per cent in 1915 and 65 per cent in 1916. The employees have subscribed \$242,400 to the Liberty Loans, an average subscription of \$55.17 from 41.7 per cent of the total number of trainmen.

In concluding the discussion of a living wage, the company shows that the present annual earnings of its trainmen are considerably higher than the annual earnings fixed by the Railroad Wage Commission for practically all employees of steam railroads. Electricians, station agents, blacksmiths, structural iron workers, car inspectors, telegraphers, masons, carpenters, painters, car repairers, all receive much less than the trainmen of the Public Service Railway. The details are shown in Fig. 3. In the company's opinion, the conclusions of the Railroad Wage Commission, transmitted to the Director General of Railroads in April, 1918, are of prime importance in this case.

The company concludes, therefore, that the wage rates should be fixed at 35 cents and 40 cents an hour, with

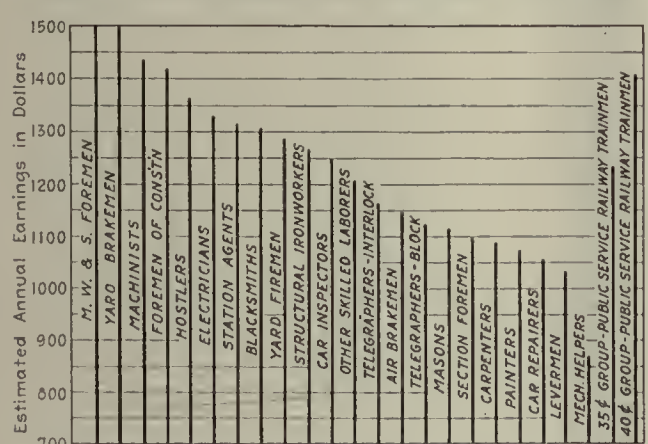


FIG. 3.—ESTIMATED AVERAGE EARNINGS OF STEAM RAILROAD EMPLOYMENT FOR 1918 COMPARED WITH THOSE OF PUBLIC SERVICE RAILWAY TRAINMEN AT PRESENT RATES

a probationary period as now obtaining. The demand of the men for 60 cents an hour with 90 cents for overtime the company characterizes in these words:

The saddling of this extra expense upon this company is unwarranted upon the theory that it is necessary to preserve the former standard of living of trainmen, where it has been shown that the present wages insure the maintenance of the standard of living prevailing before the war and enable the trainmen to live in health and reasonable comfort. Under such circumstances, the only justification for increases is to advance the standard of living of trainmen to a standard heretofore unknown, and this can only be justified upon the theory that war-time is a suitable time in which to try social experiments.

Women Conductors in Baltimore

They Began Service on July 11 and the Force Is Being Increased—Public's Attitude Gratifying to Company

WHILE women conductors have been on the cars of the United Railways of Baltimore only a short time, they have applied themselves to their work so earnestly and the public has taken to this innovation so naturally there appears to be no question that they will be an unqualified success in holding the places of the

soldier and sailor boys until the war is won and the "warriors" return to resume their old platform positions. The women went on the cars on July 11. There was not a large number—just half a dozen were in the first little squad that was graduated from the training school at Park Terminal, where the intricacies of their new profession had been explained and its principles expounded. This first installment of women conductors was placed on the vestibuled pay-as-you-enter cars of the St. Paul Street and Boulevard lines, and the number has been gradually added to until there were fifteen on the cars on July 19, and more to go into service shortly. The uniform worn consists of a plain skirt and a coat of military cut except that it has wide collars. Straw hats are worn. The lady in civilian clothes in the group is Mrs. Anna Cook, the supervisor of women conductors.

The reception of women conductors by the Baltimore public was similarly gratifying. There may have been in some quarters a belief that, while women had succeeded in this calling in other large cities here and abroad, there might be a difference in Baltimore—a Southern city. If there was a difference in the reception given the women it was difference on the side of respect and hearty co-operation from the patrons of the cars and the press of the city.

The women conductors are paid the same scale of wages as the men—35 cents an hour the first year, with an increase of 1 cent an hour each year of service. They are guaranteed a minimum wage of \$75 per month.

Forged Axle Bearings Show Economy Over Steel Castings

As an economy measure the Portland (Ore.) Railway, Light & Power Company is now forging axle bearings instead of using steel castings. The forgings at present cost \$4.20 per pair, while even a year ago the steel cost \$6 per pair. The oil well required in some of these bearings is cut out with a resistance welder.

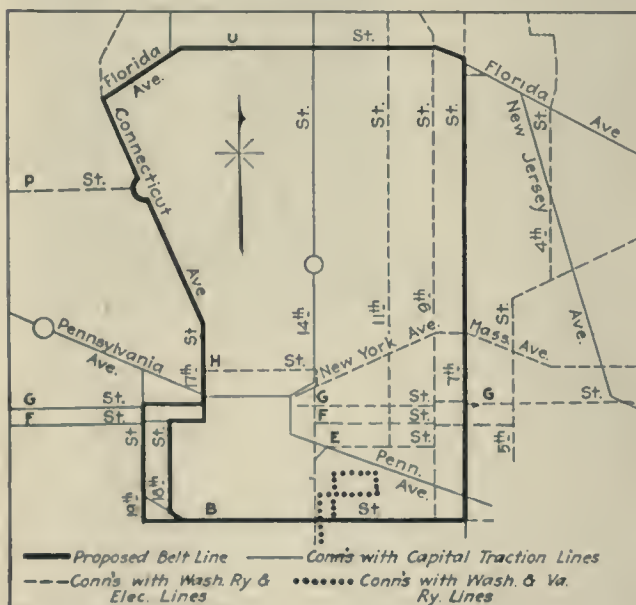


WOMEN CONDUCTORS IN BALTIMORE WEAR STRAW HATS

Belt Line Recommended for Washington

John A. Beeler Shows How Vast Growth of Army and Navy Clerical Forces Can Be Handled Comfortably

SECTION 10 of the Beeler report on the traffic situation in Washington has just been issued. It is now under the joint consideration of the Army Department, the Navy Department and the Public Utilities Commission of the District of Columbia. It is devoted primarily to a discussion of the best way of providing transportation to and from a number of the large office buildings which the government has been obliged to erect on park grounds, especially on the Mall and in Potomac Park, Washington, to supply offices for the War and Navy Departments, Fuel and Food Administrations, Council of National Defense, Red Cross and



MAP SHOWING ROUTE OF PROPOSED BELT LINE IN WASHINGTON

War Trade Board. One group of these buildings is at Sixth and B Streets and provides office room for more than 18,000 employees. Another tremendous group of buildings is being completed in the Potomac Park section between Seventeenth and Twenty-first Streets and more than 24,000 people will be located here. These two new groups of buildings are in what were heretofore unimportant sections of the city with limited transportation facilities.

To serve this district the report recommends the construction of a belt line railway as shown in the map, to connect with the three railway systems of Washington. Existing track can be used to a considerable extent so that of the entire distance around the belt of approximately 6.1 miles, only 1.5 miles will have to be built. The report suggests that the line can be operated in several ways but recommends that the Capital Traction Company operate one track in one direction and the Washington Railway & Electric Company the other track in the other direction. Then the operation of each would be entirely independent of the other and the public would have the option of boarding the first car

in either direction. Mr. Beeler adds that the company furnishing the best service would undoubtedly be rewarded with the best patronage.

LETTERS TO THE EDITORS

A Push-Button Car Is Practical

SAFETY CAR DEVICES COMPANY

ST. LOUIS, Mo., July 23, 1918.

To the Editors:

I have just noticed the editorial on page 90 of your July 20 issue regarding the "Remote Control or Push-Button Car."

I fully agree with you that there is no reason, mechanically, why the remote control, as outlined, should not be an established fact; such control to include the starting of the car, operation of the brakes, doors, sand, etc. It is only a question of whether the industry would pay the added expense and whether the control could be worked out to be entirely automatic, as you state. No doubt the editorial in question will start some of our railway operators to thinking along the lines suggested.

C. P. CASS, President.

Copies of Fare Circular

SIoux FALLS TRACTION SYSTEM

SIoux FALLS, S. D., July 28, 1918.

To the Editors:

We have on hand a supply of extra copies of our little paper *On the Cars* which was used so effectively in our recent campaign for a 6-cent fare, and the thought has occurred to us that it might be of assistance to other roads which are engaged in the same endeavor for increased rates if it was brought to their attention. If you think it advisable to put such a notice in the JOURNAL we shall be very pleased to assist the electric railway fraternity by forwarding to them on request copies of the issue mentioned.

R. C. MILLS, Manager.

Charging Batteries from a Shop-Motor Circuit

SELMA TRACTION COMPANY

SELMA, ALA., July 25, 1918.

To the Editors:

The method for charging batteries described on page 69 of your July 13 issue is all right for a large road with facilities for doing things easily and where no account need be taken of the cost. But what is the little road to do when it wants to charge its batteries and must of necessity keep down costs?

The writer has always charged batteries, when necessary (and regardless of what the expert battery people say), on a 500-volt circuit without injury to the batteries. If we have a large battery to charge we put it in circuit on the negative side with the motor that runs the shop machinery. This motor is of 10 hp. and uses about 8 amp. on its average load. This is about right for charging the ordinary starting battery on an automobile. If we have a smaller battery to charge

we put it in series with one of the smaller motors in the shop. By charging batteries this way no power is wasted, and the added resistance of the battery is so small that no difference can be noticed in the speed of the motor.

The writer has frequently charged the batteries of a Baker electric automobile by this method when the mercury arc rectifier usually employed for charging it has been out of commission.

W. E. NESS.

A Plea From a Minor Official

July 18, 1918.

To the Editors:

The present time, when the electric railway industry is in a state of transition, seems most opportune to bring before the proper officials a subject of vital interest to a number of electric railway employees and indirectly to the companies themselves; that is to say, the remuneration of the minor officials.

It is unnecessary to speak of rising costs to a railway executive, but it might be well to remind him, when it comes to a readjustment of wages, of the situation that confronts one group of men among his working force who are faithfully doing their work but who, being unable to press their case, must accept whatever is offered them.

Most of these men have worked their way up to their present positions by years of hard work. They served their apprenticeship on the cars or in the shops and for their industry and special fitness were advanced later to positions of trust that carried increased responsibilities as well as a larger wage. As they showed further ability they were again promoted, but their wages, in most cases, have not kept pace with their increased duties.

The carmen, on the other hand, backed by their unions, have been increasingly active, and every two or three years have presented their demands and have usually obtained what they sought. Their wages are much higher and their working conditions have improved immeasurably. With each increase to the men the companies usually have given the officials some slight advance, but not in proportion to that obtained by the men under them; in many cases, they have actually received less money. As a result it is increasingly difficult to obtain responsible and efficient employees to take the places of those officials who for any reason have left the organization. In fact, in many instances, when a vacancy occurs and a man from the ranks is advanced he finds that instead of receiving a pecuniary reward for his fitness he will have to take a cut in wages. Of course he then refuses the job unless he is given his car rate. This causes him to look upon the place as being merely of a temporary nature, and he considers that he is conferring a favor by even temporarily filling it. Again dissatisfaction arises among the other employees doing a similar work when they see a newcomer with no other reason except that he belongs to a union being specially favored.

If the service is to be kept at the standard maintained in the past, the office force must not be allowed to drift away nor must the work be allowed to deteriorate. Railroading has a certain fascination that is peculiarly its own and this accounts for the large num-

ber of good men still in the service, in spite of the extraordinary opportunities existing in other lines. But it is to be hoped, for the sake of the industry, that the powers that be will see that something besides fascination is necessary to combat the high cost of living and that when further wage increases are considered the minor officials will not be forgotten.

ONE OF THEM.

AMERICAN ASSOCIATION NEWS

Progress on Engineering Association Program

THE Engineering Association committee on subjects met in New York on Aug. 1 and arranged the program for the October meeting. Martin Schreiber, E. R. Hill, C. L. Cable and E. B. Burritt attended. At the first session there will be an address by an officer of the American, British or French army on engineering or transportation activities in the war zone, followed by discussion. In the first period of the second session the difficulties in the way of securing adequate equipment and supplies, with the remedy therefor, will be covered by an engineer, and a purchasing agent and a manufacturer will present prepared discussion. In the second period there will be an address on war activities in the United States by an officer from one of the departments in Washington, followed by discussion.

In addition to the above features the usual reports of the officers and the executive and nominating committees will be presented.

It is understood that Major-General William J. Snow, chief of field artillery, United States Army, has accepted an invitation to be one of the speakers before the Engineering Association.

Good Fellowship Meeting at Toledo

JOINT company section No. 11 held its closing meeting for the season on June 28, a purely social affair. Music, recitations, dancing, comedy and moving pictures made up the program. A buffet luncheon was served at the close. The section plans to hold a moonlight excursion during the summer and may arrange for a picnic also.

Connecticut and Rhode Island Companies Have Outings

THE Connecticut Company section held its summer outing at Momauguin, near New Haven, on Thursday, July 25. The program included field events and a ball game in the afternoon. The outing of the Rhode Island section was held at the Warwick Club on July 27.

Musical Program at Manila

THE meeting of Company Section No. 5, held at Manila on June 4, was largely occupied with a musical program furnished by the transportation department orchestra. The chairman of the program committee read a list of nine names of members who will present papers at coming meetings.

Reclaiming Old Cars as a War Measure

Seattle & Rainier Valley Railway Remodels Two Cars to Provide Better Entrance and Exit Facilities — Larger Wheels Used

BY K. A. SCHALLER

Electrical Engineer and Master Mechanic, Seattle & Rainier Valley Railway

THE Seattle & Rainier Valley Railway serves a section of Seattle which contains a large proportion of shipbuilding employees. The shipyards early in the war had contracts for a large number of ships and were rushing the construction work. As more firms began to enter the shipbuilding business the number of employees increased proportionately. This caused added congestion to the already fully-loaded transportation facilities until the necessity for additional passenger equipment became pressing.

Due to war conditions electric railway lines on the Pacific Coast have found it increasingly difficult to secure reasonable deliveries of cars or equipment from Eastern manufacturers, so the needed cars could not be obtained except with long delays. The constantly rising cost of material of all classes prompted this road to make a careful investigation of old equipment to determine whether in the face of the present cost of new replacing equipment it would not be advantageous to reconstruct some of this and bring it sufficiently up to date to warrant placing it in service. The company had on hand two 35-ton, 55-ft. vestibuled passenger and baggage cars with steel underframes. These were of the three-compartment type with passenger, smoker and baggage sections, a cab for the motorman and a vestibule on the rear. The equipment consisted of four Westinghouse-305 motors and K-34 control for single-end operation. The brakes were straight air with D2 compressors.

These cars had become obsolete due to the increased schedule speed now used and to the inadequate entrance and exit facilities. The maximum speed could not be increased as vertical clearances necessitated the use of 30-in. wheels with these car bodies. The single narrow entrance and exit increased the loading and un-

and a center entrance and exit and a front exit introduced. The original smoking compartment was made a part of the main passenger compartment and the original baggage compartment was converted into a smoker. The car dimensions were left unchanged except that the right side was closed off to make room for the new front exit.

The opening for the center doors and steps was cut through the wall on one side of the car so as to remove two complete double windows. These window casings,



PIPING ARRANGEMENT AT ENTRANCE AND CONNECTIONS FOR DOOR OPERATION

sash, etc., were installed where the baggage doors were removed. In this construction it was necessary to cut but one longitudinal I-beam completely away and to cut off one-half from the top of the next I-beam, making it in effect a T-beam for the length of the well.

In order to retain the strength in the longitudinal sills which were cut, the framework around the doors and steps was constructed of channel and T-iron, the truss rod on that side of the car was lengthened and an additional turnbuckle inserted, and the truss rod was placed in the channel which supports the door and step structure. This maintains the function of the truss rod and gives added bracing to the door and step apparatus.

All the material used for this reconstruction except



VIEWS OF CAR BEFORE AND AFTER ALTERATIONS WERE MADE

loading time and made the stops exceptionally long. An accompanying illustration shows one of these cars before reconstruction.

In January, 1917, the reconstruction of these two cars was undertaken with the idea of lowering the roofs by cutting off the monitor decks and making arched roofs. The rear vestibules were also closed

the new channel and T-iron necessary to build the framework for the doors and steps was taken from the car as originally constructed.

Standing room for about fifteen passengers is possible in the loading well, and a pipe framework with the opening into the car is so located that the passengers must pass the conductor and fare box as they leave the load-

ing well. In using the center doors as exits the conductor controls two openings in the pipe framework which permits quick unloading. All doors are the company's standard for all-steel cars. Those at the center are each made up of two similar sections to each opening, each half being split and hinged. They are operated by the conductor by means of a sprocket and chain through one sectional shaft at the top. The front exit door is operated by the motorman.

As a safety feature a 40-watt lamp was installed over each door. These are connected in series with two lamps in the motorman's cab placed in a box with a red glass. When any door starts to open and the threaded shaft is turned three-quarters of one revolution it releases a spring switch placed on the ground side of the lamps, thus turning them on and warning the motorman that the doors are open and the car must not be moved.

The city ordinances of Seattle require that headlights be dimmed when operating in the city. In compliance therewith two 40-watt lamps illuminating the side roller destination signs together with four lamps in the front destination sign are connected in series with the headlight, thus dimming it. Outside the city the side signs are not needed so these lamps are cut out, thus enabling the headlight to give better illumination.

One of these cars has since been equipped with Westinghouse AMM brake equipment with M22 brake valve which is standard for the company's steel cars. This car is now hauling a trailer during the rush-hour period. The trail car is equipped with AMM trail-car brakes which have all the value of automatic brake equipment with the added advantage of the quick recharge feature. This motor and trailer train have materially relieved the congestion incident to close headway during the rush hour. At a later date the companion car will have a trailer added in the same manner.

Storing Brakeshoe Heads Symmetrically



CABINET FOR STORING BRAKESHOE HEADS

IN MANY street railway shops, brakeshoe fittings are stored in a heterogeneous pile in some odd corner, with little or no thought as to convenience in picking out the proper style and size. At the Framingham (Mass.) shop of the Boston & Worcester Street Railway, shoe heads are stored on adjustable metal shelves with as much care as though they were incandescent lamps. "Rights" are not carried in the same compartment as "lefts," there being no apparent saving in space by so doing, and time is saved by grouping similar parts together.

Such an arrangement gives a neat appearance to the shop, enables the stockman to tell at a glance what types to order, and saves the repairman much time and labor in making replacements.

Indicating Tail Lights Prevent Accidents and Save Power

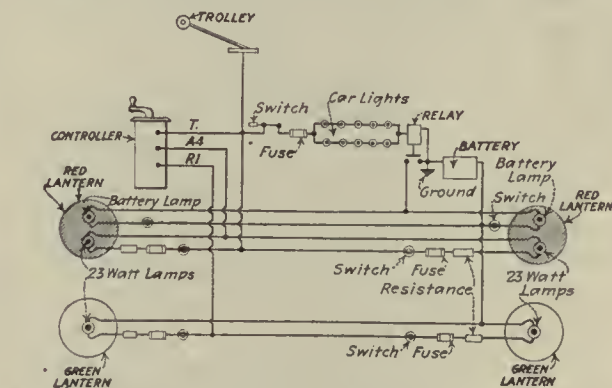
THE cars recently ordered by the Philadelphia Rapid Transit Company for service to the Hog Island shipyard are equipped with Nichols-Lintern indicating tail lights. These consist of two lanterns, one provided



REAR OF A CAR OF THE CLEVELAND RAILWAY EQUIPPED WITH INDICATING TAIL LIGHTS

with a red lens, the other with a green lens. The lanterns are mounted on the ends of the car, one on either side of the trolley catcher. The circuits controlling the lamps in these tail lights are interlocked with the control apparatus so that a red light is visible when the car is stationary or coasting with power off. Both red and green lights are burning when the controller is in

series or half-speed position. With the controller in full-multiple or full-speed position the green light alone burns. The accompanying diagram shows the connections necessary to accomplish these results.



WIRING DIAGRAM FOR INDICATING TAIL LIGHTS WITH AUXILIARY BATTERY SYSTEM

These tail lights are arranged with an auxiliary battery circuit which supplies current to a lamp in the red lens in case the main power supply should fail, as when the trolley leaves the wire.

The safety and economical features claimed for this device are: In congested sections cars can operate closer to the car ahead without danger of accidents. By having an indication as to the operation of the car ahead, the motorman is able to coast more and have less need for applying his brakes than otherwise. Automobile and truck drivers behind cars equipped with these indicating tail lights are able to regulate their speed to that of the car and thus avoid collisions while also saving time.

Recent Happenings in Great Britain

Need for Economies Becomes More Pressing as War Goes On— Operating Results in London and Glasgow

(From Our Regular Correspondent.)

The Sheffield Corporation bill has received the sanction of the House of Commons. Evidence was given in support of the clauses to enable the corporation to carry goods and parcels on its tramway system. At the inquiry the general manager of the Huddersfield Corporation Tramways said that in his view the carriage of goods and parcels by tramways was the most economical method of transport, and he considered the powers sought by the Sheffield Corporation were in the interests of the city. Huddersfield's maximum charge for the carriage of coal by tramway is 3d. per ton-mile. In the Sheffield bill it was proposed to charge a maximum of 2d. per ton-mile.

WOMEN DRIVERS OPPOSED

The Sheffield tramways and motors committee recommends that should it be necessary to employ women as drivers of cars they should be subject to the same conditions as regards pay, etc., as those under which men now work. The questions of a 12½ per cent increase upon total earnings of tramway employees and equal pay for women have been the subject of a conference, and the executive of the Council of Municipal Tramway Authorities, not being able to advise the granting of the requests, has signified its willingness to submit them to arbitration. With a view to economizing, the tramway committee recommends: (1) blotting out of "Stop-by-request" stations in as many places as possible; (2) requesting the public to refrain from overcrowding and ladies to shop at quiet times of the day; and (3) motormen to economize in every direction.

With economy as its watchword, the Liverpool tramways committee is carrying out more reforms. The latest is the abolition of a number of stops on the various routes. This is being done at the instance of the Coal Control Board. About 300, or roughly 20 per cent of the stops on the Liverpool system, are being abolished. The authorities have aimed at leveling up the distances between the different stops, so that they will average about 200 yards.

WOULD MODIFY REQUIREMENTS

The select committee on tramways (statutory requirements) has issued its report. It recommends that the Board of Trade be empowered by legislation to permit, until two years after the war, the modification of statutory requirements with regard to the charges for the conveyance of traffic on tramways and railways constructed wholly or mainly on public roads in the case of undertakings the financial circumstances of which are proved to have been injuriously affected by causes arising out of the war. Evidence was given that wages had increased from 60 to 100 per cent and the cost of materials from

100 per cent to more than 200 per cent on pre-war rates. In addition there was the increased cost of fuel, and consequently of power, coupled with restrictions on supply. Statistics were supplied showing that out of eighty municipal undertakings only twenty-eight are charging maximum fares for ordinary passengers, and forty-four maximum workmen's fares.

TRAMWAY BILL GOES TO HOUSE

After three days' consideration, the select committee to which the House of Commons referred the London United Tramways bill, has passed the preamble. The bill was unusual in respect that it asked Parliament to revoke or modify the provisions by which the company had been enabled to secure Parliamentary approval to its schemes. For some time the undertaking of the London United Tramways has been in the hands of a receiver for the debenture holders, and, at present, the tramways cannot earn enough to pay interest on the debenture stock. The bill was promoted as a *modus vivendi* by which the public service given by the company's tramways might be continued and the physical property placed promptly on a satisfactory basis. The scheme of the bill included a drastic reduction of the capital, an increase of the fares, which had been found to be impracticable and unworkable, a postponement of the date, and an alteration of the terms of purchase by the local authorities. The part of the company's undertaking inside the London County Council area and its power station at Chiswick had been acquired by the London County Council. By the clause agreed to accumulated surplus revenue is to be applied to putting the system into good condition and repair. The bill will be reported to the House.

INCREASING RAIL LIFE

Important experiments are being carried out by the Leeds tramways committee in order to produce a harder wearing surface on the tram rails in the city. The treatment consists in hardening the rail surface by heating it with an oxy-acetylene jet, and then quenching it with cold water. By this means the normal "pearlite" structure of the steel is transformed to a "sorbite" structure to a depth of ¼ in. to ½ in. The temperature to which the rail must be raised before quenching is, roughly, 700 deg. C. The practicability of the process depends partly on the nature of the adjoining paving. It is doubtful if the treatment would be economically sound in normal times, as the process is both costly and inconvenient, but at the present time when new rails are so difficult to obtain, any device which will prolong the life of the existing plant is worthy of consideration.

In the annual tramway estimates for 1918-1919 of the London County Council the total receipts are given as £3,321,750, and the working expenses are £2,593,140, showing a surplus on working of £728,610. This sum, with interest and sundry rents, makes up a total working surplus of £751,889. The charges against this working surplus to be deducted amount to £739,774, leaving a net surplus of £12,115. The estimates, which are to be brought up in a revised form, are based on the assumption that the car mileage during the year will be 50,000,000. The highways committee, reporting on the estimates, says that the realization of the improved revenue required in 1918-1919 is dependent on the revision of fares. The new scale was applied on the tramways south of the Thames in May, and early in June certain fare changes were made on the lines on the north side of the river. Owing, however, to the time occupied in negotiations with other undertakings concerned in through running services, the complete fare revision has not yet been brought into operation. The estimates contain provision of £204,000 for the payment of allowances to officers and employees on war service.

GLASGOW SURPLUS A RECORD

At a recent meeting of the tramways committee of the Glasgow Corporation the accounts for the year ended May 31 were submitted. They showed that the surplus available for handing over to the common good was the record one of £177,552, compared with £160,985 a year ago. The traffic receipts were £1,404,110, against £1,245,507 a year ago, while sundry receipts brought in £8,524 against £14,607, making the grand total £1,412,635, compared with £1,260,115 for the previous year. The traffic expenses, owing to increased wages, material and fuel, were £527,151, against £395,735, and as the increase in wages applied only to a small part of the past year, these items will again be greatly increased in the current year's accounts. The expenditure on dependents due to the war was £93,120, which compared with £92,645 a year ago. The total expenditure was £1,044,183, in comparison with £838,065, the respective balances carried to the general account being £368,452 and £422,049.

The report of the British Electric Traction Company for the year ended March 31 makes a slightly improved showing over that for the preceding period, though war conditions have not been more favorable to tramway undertakings. The return from holdings in associated concerns amounts to £210,400, as against £205,300, representing 4.93 per cent as against 4.79 per cent on the book value. The net profit comes out at £118,200, as compared with £108,700. The dividend on the ordinary stock is once more 3 per cent, and after placing £21,200, as against £15,000, to reserve, £112,100 goes forward, or £14,500 more than twelve months ago. Investments now figure for £4,263,000 and the reserve stands at £450,000. A. C. S.

News of the Electric Railways

TRAFFIC AND TRANSPORTATION

FINANCIAL AND CORPORATE • PERSONAL MENTION • CONSTRUCTION NEWS

Interest for City Suggested

Manager at Tacoma Outlines Work Necessary and Shows City Way to Obtain Substantial Interest

In a recent report to the citizens' committee of twenty-five, Louis H. Bean, manager of the Tacoma Railway & Power Company, Tacoma, Wash., suggested the financing of further betterment of the railway system by the city, for an equity interest in the company; city control of operation of the system, and a plan of gradual acquisition of the entire properties of the company by the city.

\$1,615,000 NEEDED FOR IMPROVEMENTS

Included in the report was a list of extensions and betterments which in the opinion of the company managers are necessary to place the system on a completely satisfactory basis with regard to service. This list was made by the management in reply to a request from the committee. The estimated cost of the suggested improvements and extensions is placed at \$1,615,000.

Proceeding from the assumption that the committee will continue the investigation it has commenced as agreed in the contract for temporary service, that is, establish a fair value for the property and a suitable return on capital, Mr. Bean submits a general plan for making the improvements recommended and giving the city control and eventual ownership of the system. Mr. Bean points out that the city could acquire possession of the property by getting an equity for financing betterments and increasing this equity by net returns after giving the company a fair return or by deeding the system to the city, the company leasing the system back at an agreed valuation and percentage of profit, the net earnings for the city and such taxes as were saved to go toward the purchase.

COMPANY'S PROPOSAL EXPLAINED

In submitting these proposals, Mr. Bean said:

"In order that the interests of the city may be properly protected in the matter, and that the city may proceed on a plan of acquiring the property, we recommend that the city furnish the money for improvements as outlined, acquiring an equity in the property for the amount advanced. The companies will submit direction of their operation to the City Council, or to any committee of citizens or board agreed upon for that purpose, the city granting long-time franchises or entering into a long-time contract in lieu of franchises for that purpose, all net earnings from

the whole property in excess of the amount required for depreciation and a fair return on our investment to go to the city to build up a fund for the gradual acquisition of the property by the city, such extensions as may be found necessary by the City Council, committee or board, to be made on the same basis, that is, the city furnishing the money and acquiring equity in the property.

"Or the companies will agree, on the final report of committee, in case said findings and recommendations are adopted by the city and the companies, provided some legal difficulties in connection with the mortgage can be overcome, to deed the property to the city of Tacoma, leasing the same back from the city at the valuation so fixed, all net earnings over depreciation and percentage agreed upon to go to the city toward purchase price of property. The taxes thus saved to the property would then go toward purchase of property by the city."

War Labor Policies Fixed

The National War Labor Board on July 18 issued an announcement in connection with the labor disturbances in munitions plants at Bridgeport, Conn., in which it declared that the War Labor Policies Board was not opposed to changes in wage scales during the war but had adopted the principles and policies of the War Labor Board including the following:

1. The right of the workers to organize into trade unions and to bargain collectively with their employers.

2. The continuance of existing union standards where they have heretofore applied, plus the right of the workers to obtain improved conditions, wages or hours or work through decisions of the National War Labor Board or any umpire it may select in specific cases.

3. Equal pay for equal work, whether performed by men or by women.

4. Recognition of the basic eight-hour day where a law requires it and settlement of the question of hours in other cases with due regard to governmental necessities and the welfare, health and proper comfort of the workers.

5. Maintenance of the maximum of production.

6. Due regard for the labor standards, wage scales and other conditions in particular localities in fixing wages, hours and conditions of labor.

7. Declaration of the right of all workers to a living wage, insuring the subsistence of each worker and his family in health and reasonable comfort.

Wage Increase in Brooklyn

Sixth Increase in Five Years, Effective On Aug. 2, Adds \$1,100,000 to Annual Payroll

Increases of wages to its transportation employees were announced on July 26 by the Brooklyn (N. Y.) Rapid Transit Company. The percentage of increase ranges from 10 to 25 per cent. The statement made by Timothy S. Williams, president of the company, follows, in part:

PRESIDENT WILLIAMS EXPLAINS

"In order to retain as far as possible the services of its faithful and experienced men in the transportation departments, and to attract the better class of new men seeking employment, the companies of the system have decided that they will anticipate an increase in the average rate of fare (either by official authorization or by reinstating fares previously charged and authorized by franchises and the law), by making substantial increases in the wages of their transportation men.

"The present financial condition of the Brooklyn system does not justify any increase in wages at this time, but the directors believe that it would be a serious mistake not to make every effort possible to preserve the valuable asset which both the company and the public possess in the large proportion of tried men in its service.

"The increase will cost the company on the basis of the number of cars now operated in the neighborhood of \$1,100,000 a year. The percentage of increase ranges from 10 to 25 per cent, and the principle upon which the rates were advanced has been generally that followed by the Federal Wage Commission in its recent recommendation for increase of wages to steam railroad employees, namely, consideration of the increased cost of living.

SIX INCREASES IN FIVE YEARS

"This is the sixth increase in wages of transportation employees in little more than five years. The new rates on the surface lines range from 30 cents to 40 cents an hour for motormen and conductors, and the new rates for motormen on the elevated and subway lines range from 40 cents to 50 cents an hour. Inasmuch as motormen for the elevated and subway lines are taken from the best men on the surface lines, this means that a surface motorman can look forward to a 50-cent rate through promotion to elevated and subway service. The rates of other transportation employees are increased proportionately."

The increases went into effect Aug. 2.

Service at Cost for Chicago

New Grant Will Likely Provide This With Properties in Hands of Public Trustees

Service at cost would seem to be assured as the basis of a settlement of the franchise negotiations in Chicago. The public trustee plan recommended by Special Counsel Fisher has been accepted by all parties, and at a meeting of the local transportation committee on July 29 the final draft of the ordinance was all but perfected.

The general features of the proposed ordinance have been set forth from time to time in the *ELECTRIC RAILWAY JOURNAL*, and although there has been a complete reversal of position in accepting the trustee plan the principal changes are in the financial provisions.

NINE PUBLIC TRUSTEES TO CONTROL

It is now proposed to form a corporation, "not for pecuniary profit," to be known as the Chicago Traction Company, under which a board of nine public trustees would take over for operation all the properties of the surface and elevated lines. The first board would be selected by the companies subject to the approval of the City Council. The members would continue in control until 1927. The method of selecting their successors would be decided by the City Council after that date. It is also proposed to secure State legislation for home rule so that the trustees would have all authority now held by the utilities commission.

The latest financial plan provides that all new money and all refunding is to be paid for at actual cost. Of the present capital account of the combined companies 60 per cent would be covered by bonds at 5 per cent until refunded. The remaining 40 per cent would be in the form of preferred stock with a guaranteed return of 7 per cent during the life of the ordinance and an extra allowance of 1 per cent during the average life of the existing grants, or until July 1, 1932. This would give an average return of 6.2 per cent up to 1932 and 5.8 per cent thereafter on all securities, or an average of 5.96 per cent for the next thirty years. The companies had previously insisted on a return of 6.35 per cent, and the original offer under the trustee plan was 5.6 per cent.

The companies were conceded another point by adding to the total valuation an item of \$542,104 which is for real estate owned by the elevated lines but not used for railway purposes. This makes the total elevated valuation about \$71,000,000, and the capital account of all companies as of June 30, 1916, about \$218,418,000.

PLAN AN INDETERMINATE FRANCHISE

Another change in the ordinance is the elimination of the thirty-year grant. The arrangement now proposed is for an indeterminate franchise with the right of the city to purchase and take over all the property at any time by paying the capital account. It is ex-

pected that opposition which previously existed to changing the state law in favor of grants longer than twenty years will be removed because of the greater confidence of the public in a plan which does away with private control. All the opposing elements appear to have been silenced by the latest proposal, and even the prospect of higher fares which may be necessary to furnish service at cost has not brought forth any serious criticism.

The ordinance is scheduled to go to the City Council on Aug. 5. If it meets with approval there and at the public referendum in November, the State Legislature will be asked for certain new laws next January. Other necessary steps for approval of the measure might defer the effective date until early in 1920, at which time the financial market is expected to be in shape to take care of the program for raising great sums of money.

Wage Demand Made in Providence

The demands of the union for an advance in wages approximating 62 per cent have been refused by the federal trustees of the Rhode Island Company, Providence, R. I. The heads of the union were formally notified on July 12 that the granting of the increase is impossible at present.

The demands of the men were presented to the federal trustees by James H. Coleman, business agent of the union. Theodore Francis Green, secretary of the board, stated that the demands were entirely unlooked for, inasmuch as an agreement reached last May, when increases aggregating \$300,000 a year were granted, was supposed to continue in force until May 31, 1919. The increase requested would amount to approximately \$1,500,000 a year.

Business Agent Coleman has admitted that there is an agreement between the union and the railroad company which should be in force until May 31, 1919, but declares that the men cannot live on the present wage.

An agreement has been reached whereby the matter will be tentatively submitted to the Federal board in Washington, but the Rhode Island Company has reserved rights in the matter by consenting to let the War Board handle the dispute only on condition that the status of the company, financially and otherwise, be taken into consideration.

Wages Increased in Fargo

The wages of the trainmen of the Northern States Power Company, at Fargo, N. D., have been increased to the following scale: first six months, 26 cents an hour; second six months, 27 cents; third six months, 28 cents; fourth six months, 29 cents; after twenty-four months, 30 cents. On Jan. 1, 1917, an increase of 1 cent an hour was made and on Nov. 16, 1917, a further increase of 2½ cents was made. The total increase since Jan. 1, 1917, amounts to 6 cents an hour, or 25 per cent.

No Minimum Wage Ruling

War Labor Board Will Decide Individual Cases on Basis of Particular Facts Involved

The War Labor Board on July 31 decided against establishing at this time a minimum wage to be applied generally throughout industry. It announced that the determination and the application of a fair living wage will be made in each case on the facts involved.

At the same time the board adopted a resolution, written by William H. Taft and submitted jointly by Mr. Taft and Frank P. Walsh, the joint chairmen, in which the attention of capital and labor is invited to the wisdom of composing their differences upon the basis of the principles and policies of the board as approved by the President in his proclamation of April 8.

The resolution as passed unanimously by the board follows in part:

Resolved: That this war is not only a war of arms, but a contest in industrial resourcefulness and energy.

That the period of the war is not a normal period of industrial expansion, from which the employer should expect unusual profits or the employees abnormal wages; that it is an interregnum, in which industry is pursued only for common cause and common ends.

That capital should only have such reasonable returns as will assure its use for the world's and nation's cause, while the physical well-being of labor and its physical and mental effectiveness in a comfort reasonable in view of the exigencies of the war should likewise be assured.

That this board should be careful in its conclusions not to make orders in this interregnum, based on approved views of progress in normal times, which, under war conditions, might seriously impair the present economic structure of our country.

That the declaration of our principles as to the living wage and an established minimum should be construed in the light of these considerations.

That for the present the board or its sections should consider and decide each case involving these principles on its particular facts and reserve any general rule of decision until its judgments have been sufficiently numerous and their operations sufficiently clear to make generalization safe.

Would Pool Interests Now

The Public Service Commission for the First District of New York has approved and sent to the Board of Estimate of New York City a form of agreement to be entered into by the city with the Interborough Rapid Transit Company modifying dual subway contract No. 3, so as to provide for the commencement of the forty-nine-year lease of the subways to the Interborough to begin on Aug. 1, 1918. Under the dual system contracts the Interborough has a forty-nine-year lease of the underground lines assigned to it, including the original Interborough subway. One of the terms of dual contract No. 3 was that the lease of the original subway should be abbreviated and made coterminous with the leases for the new subway lines which have been constructed since, and which are to be operated by the Interborough in connection with the old lines. By the signing of this agreement the lease will go into effect and as a result of the pooling of the earnings, the city will begin to share profits months earlier than would otherwise be the case.

War Labor Board Grants 48-Cent Maximum

This Award Made for Surface Lines in Chicago, Cleveland and Detroit—Maxima in Smaller Cities 42 Cents and 45 Cents—Board Asks President Wilson to Urge Special Legislation Looking to Appointment of Federal Agency to Raise Fares Where Necessary

Wage increases ranging from 35 to 65 per cent were granted on Aug. 1 by the War Labor Board to the employees of twenty-two electric street and interurban railways in various parts of the country. The awards were handed down just as this issue was going to press, and consequently the full details cannot be published until later. From the preliminary data released by the Committee on Public Information, however, a general idea of the scope of the decisions can be secured.

The wages of surface-line trainmen in the larger cities of Chicago, Cleveland and Detroit have been fixed at rates running from a minimum of 43 cents an hour to a maximum of 48 cents an hour. The maximum in the case of the Chicago Elevated Railways is 50 cents an hour. In the smaller cities, where the cost of living is less, the new rates vary in general from a minimum of 38 cents an hour to a maximum of 42 cents an hour, or from a minimum of 41 cents an hour to a maximum of 45 cents an hour. In a few cases the interurban wage rate has been put $1\frac{1}{2}$ to 2 cents an hour higher than the new city rate near by. The general minimum for trackmen, pitmen, oilers and similar employees seems to be 42 cents an hour.

FEDERAL AID IS NEEDED

In announcing these increases, the War Labor Board said that it had recommended to President Wilson that special legislation be enacted by Congress to enable some executive agency of the federal government to consider the financial condition of the electric railways of the country and raise fares in each case in which circumstances require it.

In explaining this proposal the board said:

"We believe it to be a war necessity justifying federal interference. Should this be deemed unwise, however, we urge upon the local authorities and the people of the locality the pressing need for such an increase adequate to meet the added cost of operation.

"This is not a question turning on the history of the relations between the local electric railways and the municipalities in which they operate. The just claim for an increase in fares does not rest upon any right to a dividend upon capital long invested in the enterprise. The increase in fare must be given because of the imminent pressure for money receipts now to keep the electric railroads running so that they may meet the local and national demand for their service.

"Overcapitalization, corrupt methods, exorbitant dividends in the past,

are not relevant to the question of policy in the present exigency. In justice the public should pay an adequate war compensation for a service which cannot be rendered except for war prices.

"The credit of these companies in floating bonds is gone. Their ability to borrow on short notes is most limited. In the face of added expenses which this and other awards of needed and fair compensation to their employees will involve, such credit will completely disappear. Bankruptcy, receiverships and demoralization, with failure of service, must be the result. Hence our urgent recommendation on this head."

CASES DECIDED SEPARATELY

The wage increases awarded by the War Labor Board were on a sliding scale and varied, being based on local conditions and facts peculiar to the individual cases. In practically all instances, the awards were made retroactive. In all cases where employees are compelled to work in excess of the period of their regular runs the companies must pay overtime on the basis of time and a half.

While not going deeply into the question of labor unions, the board, in cases where the right of employees to organize was an issue, ordered that workers be protected in the exercise of their right to join trade unions without fear of molestation by the employer.

A step to accelerate the method of graduating men from one wage classification to another also was taken by arbitrarily fixing the limit of apprenticeship on cars at one year, with a probationary period of three months.

REMARKS IN PARTICULAR CASES

Regarding the Chicago companies the board said:

"The award in this case is an increase in maximum wages from 39 to 48 cents an hour. It was required by an increase in the cost of living and is not more than fair. It does entail on the companies, however, a heavy increase in their operating expenses. The showing made by the companies to us clearly discloses that in order to enable them to render adequate service the fares they are permitted to charge should be substantially increased."

The increase in the case of the International Railway was conditioned upon the continuance in force of the rate of fare recently granted by the City Council. Should this rate be revoked then the wage increases shall automatically terminate.

The board in the case of the Columbus Railway, Power & Light Company ordered that there be no interference

with the employees' right to organize, and that four men who previously had been discharged by the company be reinstated.

In awarding the Detroit increase, the board said that it was substantial but fair. The board, however, recommended a raise in fare. Permission was also given for the employment of women or negro men if the necessity arises. Sunday and holiday runs in Detroit are to be no more than eight hours, the board decided, while night runs will be eight hours with ten hours' pay. The company's open shop policy is to be continued and is "not to be deemed a grievance" by employees.

A wage of \$17.50 per week is to be guaranteed for the first year and \$20 a week thereafter by the Public Service Railway. Regarding other employees the board ordered that men should be paid in accordance with the actual platform time that they work, and their request for a ten-hour day was denied.

48-CENT MAXIMUM

The list of awards made by the War Labor Board follows:

Chicago Surface Lines—Motormen and conductors, first three months, 43 cents; next nine months, 46 cents; thereafter, 48 cents; effective on Aug. 1.

Chicago Elevated Railways—Motormen, extra, first three months, 44 cents; next nine months, 45 cents; thereafter, 50 cents; motormen, regular, first year and thereafter, 50 cents; effective on Aug. 1.

Chicago & West Towns Railway—Motormen and conductors, 43 to 48 cents per hour, effective Aug. 1.

Cleveland Railway—Motormen and conductors, 43 to 48 cents per hour, effective June 1.

International Railway, Buffalo, N. Y.—Motormen and conductors, 43 cents an hour for the first three months, 46 cents for the next nine, and 48 cents thereafter. Operators of one-man cars, 5 cents an hour above this scale. Engineers on freight cars, for the first three months 45 cents an hour, the next nine months 48 cents, and thereafter 50 cents. Conductors on freight cars, 44, 47 and 49 cents an hour. Brakemen on freight cars, 41, 44 and 46 cents an hour. Increases retroactive to June 1.

Detroit United Railway—Motormen and conductors, 43 to 48 cents an hour.

45-CENT MAXIMUM

Public Service Railway, Newark, N. J.—Motormen and conductors, first three months, 41 cents an hour; next nine months, 43 cents an hour and thereafter 45 cents an hour.

Scranton Railway—Motormen and conductors, first three months, 41 cents an hour; next nine months, 43 cents an hour, and thereafter 45 cents per hour.

Columbus Railway, Power & Light Company—Motormen and conductors, 41 to 45 cents an hour, effective July 1, 1918.

Evanston (Ill.) Railway—Motormen and conductors, 41 to 45 cents an hour, effective Aug. 1.

Omaha & Council Bluffs Street Railway—Motormen and conductors, 41 to 45 cents an hour; minimum for other employees, 42 cents an hour, effective July 17.

East St. Louis lines, East St. Louis, Ill.—Motormen and conductors, 41 to 45 cents an hour; interurban, 47 cents an hour, effective July 1.

Schenectady Railway—City lines, motormen and conductors, 41 cents an hour for the first three months; 43 cents for the next nine and 45 cents thereafter. On interurban lines, 46½ cents an hour.

New York State Railways (Rochester)—City lines, the same as for Schenectady; interurban lines, 47 cents an hour, and the West Shore Railway, 50½ cents an hour.

MAXIMUM OF 42 CENTS OR LESS

Cleveland, Painesville & Eastern Railway and Cleveland, Painesville &

Ashtabula Railway—Motormen and conductors, 38 to 42 cents an hour.

Cleveland, Southwestern & Columbus Railway—Motormen and conductors, 38 to 42 cents per hour; other employees, minimum of 42 cents an hour, effective April 1.

Cleveland & Eastern Traction Company—Motormen and conductors, 38 to 42 cents an hour, effective May 1.

Galesburg Railway, Lighting & Power Company—Motormen and conductors, 38 to 41 cents an hour, effective July 13.

New Jersey & Pennsylvania Traction Company, Trenton, N. J.—Motormen and conductors, first three months, 38 cents an hour; next nine months, 40 cents an hour; and thereafter 42 cents an hour.

New Orleans Railway & Light Company—Motormen and conductors, 38 to 42 cents an hour, effective July 1.

Joplin & Pittsburgh Railway—Motormen and conductors, 38 cents an hour for the first three months, 40 cents an hour for the next nine months and 42 cents an hour thereafter.

United Traction Company, Albany, N. Y.—Minimum wage of 40 cents an hour.

weighed and determined by those most competent to know of them and to deal with them."

FEDERAL AID SHOULD BE ONLY ADVISORY

In conclusion the committee stated its suggestions to President Wilson in the following words:

"The special war committee is of the opinion that there is no provision or decision of statute which can be construed to empower the federal government to fix the rates of utilities except where they are taken over and operated by the government as a war measure, and even in such cases the right of the national government to fix intrastate rates would be open to question. But at this time we are considering methods of administration rather than questions of authority. We feel that the national emergency calls for action.

"There is nothing objectionable in the suggestion that you appoint a national administrator of electric railways, whose power and duty shall be the crystallizing and expression of the national view and interest as to war-time conservation of this essential public service.

"Therefore we respectfully advise:

"1. A national administrator or board of three, with power of recommendation, advice or request to the state and municipal authorities.

"2. No disturbance of the rate and service powers of the state commissions or the contractual powers of the municipalities, except as the state or municipal authorities may subordinate these to the federal recommendations for the emergency, as we believe would almost universally be done.

"3. Use of the state commissions by the federal administrator or board for all purposes of inquiry, investigation, ascertainment and report of facts, and co-operation in recommendations, where needed, to the state or local authorities.

"Any increases granted should, of course, be for the war period only. The foregoing machinery as to increases in rates should be available also to accomplish betterments in service, to meet the needs of workers in war industries or for the general public."

Commissions Ask Federal Advice

War Committee Requests President Wilson to Appoint Federal Administrator or Board to Recommend Railway Relief Without Disturbing Local Regulatory Powers

President Wilson has been asked by the war committee of the National Association of Railway and Utility Commissioners to appoint a federal electric railway administrator or board to aid commissions and municipalities by recommendation and advice in assuring the maintenance of adequate rates and service. While recognizing that electric railways need assistance, the regulatory association opposes the idea of direct federal control over local utilities and asserts that the powers of commissions or municipalities should not be disturbed except as these are voluntarily subordinated to federal recommendations in this emergency period.

RAILWAY EFFICIENCY MUST BE MAINTAINED

The request to President Wilson is contained in a communication signed by Charles E. Elmqvist, president of the association, and submitted on July 3. This communication reads in part as follows:

"The committee fully recognizes, as must every open-minded analyst of the conditions confronting public utility service, that the war has brought sharp advances in operating cost, a necessity for readjusting wage scales upwards, and severe inroads upon the revenues ordinarily applied to the upkeep of the property and the payment of some degree of return to the investors. The requirements of the war situation have, in many instances, made abnormal demands upon the facilities and resources

of the local electric lines. Almost everywhere it is true that the maximum efficiency of the nation in war-time industry would be seriously menaced by the breaking down or the abridgement of service.

"It would seem clear that whatever action is taken under federal auspices or otherwise should properly recognize that each application for an increase in rates or a curtailment in service should be separately considered and determined on its own merits by a tribunal representative of the public interest. Not every application which is made should be granted. Not every rate should be increased above the figure charged before the war. No way should be opened whereby the existence of a war-time emergency could be made a cloak or cover for an effort to rehabilitate enterprises unprofitable and foredoomed to failure before the war started. No federal action should seek to prompt an increase greater than is commensurate with the burdens placed upon the particular utility by the war.

"It would seem equally clear that the need of an electric railway for a rate yielding more revenue than that afforded by the rate permitted in the existing franchise does not in itself establish that, through federal recommendation or otherwise, such a change in the franchise rate should be brought about without a change in other franchise terms. That, again, is a question as to which the merits and equities of the particular situation ought to be

"H" System Subway Service Started

On Aug. 2 the Interborough Rapid Transit Company in New York City began subway operation under what is termed the "H" plan. This involves such a combination and separation of the old and new subway lines as to form distinct East Side and West Side systems, furnishing through service north and south. Connection between the two is provided by a transfer shuttle service on Forty-second Street between Times Square and Grand Central Station, and the old through service via Fourth Avenue, Forty-second Street and Broadway is discontinued.

The inauguration of the new through services was celebrated by a meeting

at the Hotel Astor on the evening of Aug. 1 after a special train carrying the guests of the Public Service Commission had made the circuit of the Fourth Avenue and Seventh Avenue lines from Grand Central Station to Times Square with Mayor John F. Hylan acting as motorman. The rapid transit situation in the city was covered from various angles in addresses by Charles B. Hubbell, chairman of the Public Service Commission for the First District; Mayor Hylan; Oscar S. Straus and William R. Willcox, ex-chairmen of the commission; George McAneny, former president of the Board of Aldermen; Theodore P. Shonts, president of the Interborough Rapid Transit Company, and A. E. Marling, president of the New York Chamber of Commerce.

Milwaukee Electrification Proceeding

The electrification of the lines of the Chicago, Milwaukee & St. Paul Railway, between Othello, Seattle and Tacoma, is proceeding so rapidly that service may be expected within less than one year, according to C. A. Goodnow, Chicago, vice-president in charge, who recently returned to Seattle.

The eight substations are nearing completion, and by Aug. 15 will be ready for the electrical apparatus. The stations will cost approximately \$200,000. The trolley, transmission and other copper wires needed will be drawn at a new wire mill which has been constructed by the Anaconda Copper Mining Company at Great Falls. Stringing of wires will begin on Aug. 11 at Hyak, just east of the summit of the Cascade Mountains, and at Rockdale, just west of the summit.

It is expected the locomotives will be delivered during the spring of 1919. They will be tried out in the electric zone in Montana before being brought to the coast.

Wants Provision for War Workers

Two government officials appeared before the Council and citizens' advisory committee on street railways at Cincinnati, Ohio, during the week ended July 27 to urge that in the proposed revised franchise to the Cincinnati Traction Company, provision be made for ample facilities for accommodating munition workers, even at the expense of an increase in the rate of fare. They were Charles L. Harrison, district chief of the United States Ordnance Department, and Capt. T. F. Geraghty, of the Ordnance Department. They declared that good street railway facilities are necessary to keep production of munitions up to the standard.

The committee assured the officials that the revised ordinance would make it possible for the company to pay its men higher wages and thus insure the employment of a sufficient number to operate the cars. Company officials had complained of difficulty in securing men under present conditions.

News Notes

Wage Request Met.—The Montreal (Que.) Tramways has acceded to the request of its employees for higher wages. For a time it appeared as if the wage negotiations might fail.

Increase in Wages in Easton.—The conductors and motormen in the employ of the Northampton, Easton & Washington Traction Company, Easton, Pa., have received an increase in wages, amounting to 2 cents an hour. Under the new schedule the first-year men will receive 30 cents an hour. The five-year and over men will receive 36 cents an hour.

Wage Increase for Municipal Employees.—Employees of the municipal railway in Tacoma, Wash., have been conceded by the Tacoma Railway & Power Company, which operates the line, ten hours' pay for eight hours' work. Before the recent raise in wages, the employees working split shifts were allowed ten hours' pay for six or seven hours' work.

Week-End Industrial Conference.—A conference whose theme will be "Human Relation and Betterment in Industry and Transportation During the War" will be held at Silver Bay on Lake George, N. Y., Aug. 9 to 11. H. H. Westinghouse is chairman of the promotion committee. Horace E. Andrews, president of the New York State Railways, will preside at the meeting on the evening of Aug. 9.

Service-at-Cost Agitation.—A movement is on foot in the Twin Cities for a joint cost-of-service franchise for the Twin City Lines. The Mayors of Minneapolis and St. Paul and other officials do not seem to be very favorably disposed toward the Twin City Rapid Transit Company's request for a 6-cent fare and the whole matter is to be threshed out at conferences with the railway officials. The first joint municipal official conference has taken place.

No M. O. Planks in New York.—The New York Democratic State Convention rejected the Hearst plank declaring for public ownership of public utilities and recited merely that cities "ought" to have the right to enter upon public ownership if they desired. The Republican Convention was silent on the subject. Col. Theodore Roosevelt, who addressed the Republicans, declared it would be very unwise to disturb the present control of public utility properties.

Men Ratify Wage Agreement.—At a conference held recently at the office of H. S. Newton, manager, at Parkersburg, W. Va., between officials and representatives of the employees

of the Monongahela Valley Traction Company the contract concerning the recent 20 per cent increase in wages allowed employees of the local division was signed by the men representing the employees with only a few minor changes. The contract has now been sent to Fairmont for the signature of the company officials, when it will become effective.

Seattle Inquiry Under Way.—The Public Utilities Department of Seattle, Wash., has begun an investigation of the books of the Puget Sound Traction, Light & Power Company to obtain data with which to determine the amount of increased earnings to which the company is entitled in the proposed plan of bettering railway service. Superintendent of Public Utilities Murphine will supervise the work, which will be done by employees of the city comptroller's office, aided by employees of Mr. Murphine's office. It is expected that two weeks' time will be required to complete the work. The plan under which this inquiry is being conducted was referred to at length in the *ELECTRIC RAILWAY JOURNAL* for July 27, page 166.

Butte Electricians at Fault.—The arbitrators appointed to adjudicate the differences between the Butte (Mont.) Electric Railway and the International Brotherhood of Electrical Workers, have found, that if the company violated the contract between it and the union in permitting a subforeman to remove and replace burned out coils at the Florence Street substation it was at most a technical violation. The arbitrators further found that the union in imposing a fine of \$100 without prior notice to the company failed to conform to the provisions of its contract requiring that any difference arising over the interpretation or application of any part of the contract be referred to arbitration. The electrical workers shut off power and tied up the railway. Motormen and conductors had no grievance.

Storm Interrupts Service at Dallas.—Service on the Dallas-Fort Worth interurban line, operated by the Northern Texas Traction Company, was interrupted for twenty-five hours and considerable damage was done recently to the poles and lines of the company by a storm that passed between Dallas and Fort Worth. Nearly 2 miles of wire were blown down by the storm, and the high-tension line which supplies current from the power station at Handley for operating the cars of the Dallas Railway in Oak Cliff was broken. On this account, the Dallas Railway found its service badly crippled, as it had to cut its power from the lines east of the Trinity River over so as to supply part of this current for the Oak Cliff lines. This curtailed service on all lines in the city. Ordinarily there are about eighty cars in operation on the Oak Cliff lines, but during the period in which the damage was being repaired only thirty-six cars could be operated.

Financial and Corporate

Baltimore Costs Mount

Net Income of United Railways & Electric Company for 1917 Drops 21 Per Cent

Operating revenues increased \$646,785, and net operating expenses, taxes and depreciation rose \$816,668—such were the results of operation for the United Railways & Electric Company, Baltimore, Md., during the calendar year 1917. The net income amounted to \$875,586 as compared to \$1,108,124 in 1916, a loss of \$232,538 or 21 per cent.

NO FLOATING DEBT

After paying dividends of 4 per cent or \$818,448 on the common stock, \$50,000 for Red Cross work and \$25,536 for other war incidentals the company had a profit and loss surplus of \$1,066,989 on Dec. 31, 1917. At the end of the fiscal year, the company had no floating debt and had cash on hand from current revenues amounting to \$671,190.

For maintenance of way, structures and equipment, there was charged to operating expenses during the year 1917 \$923,640, which with the \$528,041 credited to depreciation reserve and included in operating expenses made a total of \$1,451,682, an increase of \$121,863.

TAXES AND PUBLIC CHARGES \$1,260,712

The total taxes and public charges in 1917, including the park tax, cost of paving streets, track changes necessitated by regrading of streets and highways, widening of streets, etc., were \$1,260,712, or about 24 per cent of the net receipts after paying operating expenses. This represented an increase

played in and around Canton and Sparrows Point on the left of the harbor, and Curtis Bay and Locust Point on the right of the harbor, strained the capacity of those lines.

ONE HUNDRED NEW CARS

The company received in the early part of last year 100 new cars and in May ordered eighty more to meet the conditions stated. These cars were to be delivered in October, but not one car of this lot was received during the year. The failure on the part of manufacturers to deliver cars upon the dates agreed upon prevented the company

COMPARATIVE INCOME STATEMENT OF NEW ORLEANS RAILWAY & LIGHT COMPANY FOR YEARS ENDED DEC. 31, 1916 AND 1917

	1917		1916	
	Amount	Per Cent	Amount	Per Cent
Operating revenue	\$7,746,259	100.00	\$7,200,740	100.00
Operating expenses	4,172,010	53.86	3,603,859	50.06
Net operating revenue	\$3,574,249	46.14	\$3,596,881	49.94
Revenue deductions—taxes, etc.	816,901	10.55	781,841	10.84
Net operating income	\$2,757,348	35.59	\$2,815,040	39.10
Miscellaneous income and outside operations	64,186	0.83	68,391	0.95
Gross income	\$2,821,534	36.42	\$2,883,431	40.05
Income deductions—interest, etc.	1,944,000	25.09	1,907,196	26.49
Balance	\$877,534	11.33	\$976,235	13.56
Charges for renewals and replacements	226,308	2.92	255,883	3.55
Net income	\$651,226	8.41	\$720,352	10.01

from expanding its service as fully as planned. On a per capita basis the new cars would have been able to provide for 66,560 additional passengers a day.

Electric Roads Under Government

Among the electric railways definitely retained and made part of the government system according to recent announcements are the following:

New Orleans Net Falls

Higher Operating Costs More Than Absorb the Gains in Revenues for 1917

During the calendar year 1917 the New Orleans Railway & Light Company, New Orleans, La., suffered a loss of \$69,126 or 9.60 per cent in net income. This was due mainly to the increase in operating expenses, for while the gross operating revenues gained \$545,518 or 7.57 per cent the net operating revenue fell off \$22,632 or 0.63 per cent.

OIL AND COAL INCREASE IN COST

The principal items of increased costs were oil and coal. The proportionate share of the railway department in the operating results of the company is shown by the tabulation below in this column.

The actual charges for maintenance during the year amounted to \$883,755. In addition to this amount there was expended \$346,694 for renewals and

DEPARTMENTAL SUMMARY OF NEW ORLEANS RAILWAY & LIGHT COMPANY FOR 1916 AND 1917

	1917	1916	Increase	Per Cent
Operating revenue:				
Railway	\$4,669,389	\$4,422,777	\$246,612	5.5
Electric	1,618,552	1,433,814	184,738	12.9
Gas	1,458,316	1,344,149	114,167	8.5
Total	\$7,746,259	\$7,200,740	\$545,518	7.5
Operating expenses:				
Railway	\$2,686,562	\$2,432,364	\$254,198	10.2
Electric	886,161	635,358	250,803	39.5
Gas	599,486	531,136	68,349	12.8
Total	\$4,172,010	\$3,603,859	\$568,151	15.8
Net operating revenue	\$3,574,248	\$3,596,881	-\$22,632	0.6
* Decrease				

replacements, making a total charge of \$1,230,450. There was reserved from surplus for renewals and replacements, \$409,641, resulting in a net credit of \$62,946 for the year.

The expenditure for construction, improvements and betterments amounted to \$1,070,538, divided as follows: Railway roadway and line, \$130,567; electric line system and accessories, \$583,393; gas distribution system and accessories, \$93,355; plant equipment, \$193,909; rolling stock and miscellaneous equipment, \$9,685, and engineering and miscellaneous, \$59,626.

OPERATING RESULTS OF UNITED RAILWAYS & ELECTRIC COMPANY FOR YEARS ENDED DEC. 31, 1916 AND 1917

	1916	1917	Increase	Per Cent Increase
Operating revenue	\$9,914,051	\$10,560,836	\$646,785	6.52
Operating expenses	\$4,567,949	\$5,267,395	\$699,445	15.31
Depreciation	495,702	528,041	32,339	6.52
Taxes, licenses, etc.	\$5,063,652	\$5,795,436	\$731,784	14.45
	994,840	1,079,723	84,883	8.53
Ratio of operating expenses to operating revenues	\$6,058,492	\$6,875,160	\$816,668	13.48
Operating expenses (per cent)	46.08	49.88		5.80
Depreciation (per cent)	5.00	5.00		
	51.08	54.88		3.80
Taxes, licenses, etc. (per cent)	10.01	10.22		0.19
	61.11	65.10		3.92

of \$102,123 over 1916. The park tax for the year was \$671,711 as against \$631,018 in 1916, an increase of \$40,693. The total amount paid to the city of Baltimore in the park tax alone, since the consolidation of the railway lines in 1890, aggregates \$8,567,676.

There was considerable shifting in the company's traffic loads during the last year. The large expansion in the industries and the number of men em-

Colorado Springs & Cripple Creek District Railway.

East St. Louis & Suburban Railway. Fort Dodge, Des Moines & Southern Railroad.

Gallatin Valley Railroad.

Oregon Electric Railway.

St. Louis & Belleville Electric Railway.

Waterloo, Cedar Falls & Northern Railway.

Mr. Warburg on Utilities

Says War Finance Corporation Expects to Deal Only With Corporations that Are Solvent

Paul M. Warburg, discussing public utilities securities and their relation to war financing in the current issue of the *Journal of the American Bankers' Association*, takes the view that the national interest at this time requires that state governments and the municipalities do their utmost to find a *modus vivendi* for their public service corporations. Concerning the outstanding franchise and contractual obligations he says that in every instance the utmost care should be used to determine whether proposals for constructive new developments are essential to the successful prosecution of the war and the health and necessary comfort of the people. Mr. Warburg continues:

UTILITY CREDIT IMPAIRED

"The drastic shrinkage in the value of public utilities investments and the impairment of the credit of these corporations is a source of great danger to the general financial situation at this time. The credit of these companies must be maintained on account of innocent investors and the necessity for preserving the physical development of corporations whose operations are needed because of their direct and indirect effect upon the successful prosecution of the war.

"Franchises in many cases have become excessively onerous for such corporations, due to the fact that labor, coal, steel and copper can be secured only at exorbitant prices, while charges for services rendered often cannot be properly adjusted without the consent of the community.

"When the old Capital Issues Committee first undertook its work it arranged for a conference with public service commissioners representing the various states of the union. The committee was delighted to find that these state commissioners were not only open to suggestions made by the committee but that they were in fullest sympathy with its program and eager to co-operate in every respect.

"It is gratifying to know that a number of the leading municipalities have decided to make such equitable adjustments as to enable their public service companies to weather the storm, and it is hoped that their example will be emulated by all.

WHERE THE W. F. C. WILL HELP

"The thought may have occurred to many that the War Finance Corporation has been created to cope with this very problem. Without attempting to speak for the War Finance Corporation and restating only what its directors have publicly expressed, I may say that this corporation, in a majority of cases, expects to deal only with concerns that are solvent and able to provide a bankers' guaranty. The amount that may be advanced

without that guaranty is strictly limited by law and it is safe to assume that, except where the public interest absolutely requires, the corporation will not consider itself warranted in making advances to companies on the brink of insolvency. Where advances from the War Finance Corporation are to be sought, it appears advisable, therefore, that the communities involved do their share in placing their public utilities companies on a self-sustaining basis."

North Carolina Reports Progress

The successful operation of the North Carolina Public Service Company, Greensboro, N. C., for the year ended March 31, 1918, is indicated by the fact that the gross earnings were \$641,270 (the largest since organization) as compared with \$580,491 for the previous year, an increase of \$60,778. The net earnings credited to surplus were \$99,082, as compared with \$81,875 for the previous year, an increase of \$17,206. During the year many economies were effected which resulted in

North Shore Improving

First Report Since Receivership Shows Substantial Revenue Increases and Capital Expenditures

The report of the Chicago, North Shore & Milwaukee Railroad, Highwood, Ill., for the period ended Dec. 31, 1917, shows gratifying progress since the company's receivership. The company acquired the properties of the Chicago & Milwaukee Electric Railroad on July 26, 1916, and owing to the change of accounting year by the Interstate Commerce Commission the present first report covers seventeen months.

The accompanying statement gives the operating results for the period to date, as well as some comparative figures for the calendar year 1917 as compared with the last full year of operation under receivership. It is said that earnings are improving monthly.

In the change from receivership operation to private operation there was required an expenditure of not only a great amount of labor but money in bringing the road up to the standard

COMPARATIVE INCOME STATEMENT OF CHICAGO, NORTH SHORE & MILWAUKEE RAILROAD

	July 26, 1916 to Dec. 31, 1917	Jan. 1, 1917 to Dec. 31, 1917	*July 1, 1915 to June 30, 1916
Revenue from transportation.....	\$2,227,482	\$1,682,874	\$945,088
Revenue from other railway operations.....	64,100	45,345	46,541
Total operating revenue.....	\$2,291,582	\$1,728,219	\$991,634
Operating expenses:			
Way and structure.....	\$209,193	\$149,218	\$101,531
Equipment.....	107,503	77,279	46,158
Power.....	334,660	250,548	165,221
Conducting transportation.....	486,681	373,950	180,458
Traffic.....	37,278	27,657	10,373
General and miscellaneous.....	293,309	227,154	115,884
Total operating expenses.....	\$1,468,624	\$1,105,807	\$619,625
Net operating revenue.....	\$827,958	\$622,412	\$372,009
Taxes.....	118,648	92,679	63,538
Operating income.....	\$704,311	\$529,733	\$308,471
Miscellaneous income.....	5,925		
Gross income.....	\$710,236		
Deductions from gross income.....	364,767		
Net income.....	\$345,469		

*Under receivership.

large savings. Much of these savings, however, was offset by the increased cost of operation.

The electric railway department suffered on account of the increasing cost of supplies and labor. The total number of passengers carried during 1918 was 3,818,623 as compared with 3,936,827 the previous year. The decrease in the number of passengers carried is attributed to the privately owned automobiles. The gross earnings of this department for the fiscal year amounted to \$172,876, as compared with \$168,885 in 1916. By the operation of the light one-man cars recently delivered it is expected that a large saving will be effected.

During the past year it is said the management was greatly impressed by the fairness with which both the local and state authorities met their requests for increased rates or other needed relief and also the willingness of patrons to pay more in order that the company might continue to serve the community efficiently.

of maintenance and operation expected and demanded by both the public and the governmental authorities. Between July 26, 1916, and Dec. 31, 1917, the company expended \$1,046,996 for betterments, additions and rehabilitation.

The road serves the United States Naval Training Station at Great Lakes, as well as Fort Sheridan. On account of the war the traffic to and from the Great Lakes Station has been very heavy, as a great number of men (approximating 25,000) are stationed there.

Director of 104 Companies

With the growth of management corporations a sort of multiple director has arisen in the utility field. A partner in one of these managing firms has, according to the *Directory of Directors*, a seat as director on the boards of 104 companies. Of these he is president of sixteen, vice-president of seventy-five, and director only of thirteen. Another partner is president of fifty, chairman of three, and director of sixty-six.

Financial News Notes

\$150,000,000 Mortgage Filed for Record.—A mortgage for \$150,000,000 was filed in the office of the Register of Kings County, Brooklyn, by the Brooklyn Rapid Transit Company on July 26. It was dated June 1. The mortgage was made to the Central Union Trust Company, New York, as trustee. It was issued as a result of a decision of the stockholders at a meeting in May in connection with the refunding of the company's notes mentioned previously at length in the *ELECTRIC RAILWAY JOURNAL*.

Would Abandon Part of Road.—The Westchester Street Railroad, White Plains, N. Y., has filed with the Public Service Commission for the Second District a petition asking for approval of the abandonment of a part of its line in the town of Greenburgh, which, it is claimed, is running behind. The company, it is said, has no means of financing operation or meeting the daily deficit. The commission will set an early date for a hearing. The New York, New Haven & Hartford Railroad, as owner of the Westchester road, has approved the proposed abandonment.

Stock Issue Approved.—The Capital Issues Committee has notified the Union Street Railway, New Bedford, Mass., that after due investigation into the purpose of the issue of new stock,

it has determined that the sale thereof is not incompatible with the national interest. The company plans to issue \$812,500 of new stock, the proceeds to be applied principally to paying for a new power house. The Massachusetts Public Service Commission has approved the issue. The proposed issue was referred to in the *ELECTRIC RAILWAY JOURNAL* for May 11, page 933, and June 29, page 1250.

Monongahela Plans \$5,500,000 Issue.—Bankers representing financial institutions of New York, Baltimore and Washington spent July 22 and 23 in Fairmont, Clarksburg and Parkersburg, W. Va., going over the lines and various plants of the Monongahela Valley Traction Company, which is arranging to float a loan of \$5,500,000. The proceeds of the loan will be used to refund about \$3,000,000 of outstanding obligations and to complete a big power plant at Rivesville, a gas-producer plant at Lynn, an addition to the Hutchinson power plant, the development of several gas wells and the building of about 8 or 10 miles of pipe lines.

Successor to Dan Patch Line.—The Minneapolis, Rochester & Dubuque Electric Traction Company, Minneapolis, Minn., the former Dan Patch line, has been reincorporated as the Minneapolis, Northfield & Southern Railway. The new company has bought the 38 miles of the Dan Patch road to Northfield and the 14 miles from Automobile Junction to the Luce line junction, from which it runs over the Electric Short Line to the station at Seventh Street and Third Avenue N., Minneapolis. The purchase of the property was financed by T. B. Walker, W. O. Winston, and others. James H. Ellison, of Winston Brothers Company,

railroad contractors, is president of the successor company. H. A. Whittier, Northfield, is vice-president, R. H. Benham is secretary and W. O. Winston is treasurer. The whole line is included in the deal, both from Fifty-fourth Street, Minneapolis, to Northfield and the cut-off to get into the downtown terminals.

Appeal to Alton, Granite & St. Louis Bondholders.—A circular addressed by the company to the holders of bonds of the Alton, Granite & St. Louis Traction Company says that the increased operating costs of the company together with fixed rates of income have resulted in the company being unable to pay the interest coupons due on Aug. 1. It is explained that applications are pending before the State Public Utilities Commission and the Interstate Commerce Commission for increases in rates, and that it is possible that before the note is received by the bondholders favorable action will have been taken. The company points out that it will be impossible to know the effect of such increases until after at least one month's experience, and that the net results of such increases will be affected by a possible increase in wages of employees through arbitration of the National War Labor Board. If the net results prove satisfactory, and the company is in position to pay the coupons, the holders of bonds will be notified. The company expresses the hope that both the bondholders and the trustees will be willing not to take any action under section sixteen of the mortgage securing the bonds until the management has had sufficient time to determine the effect upon the earnings caused by increase in rates and such changes in wages as may be awarded by the National War Labor Board.

Electric Railway Monthly Earnings

BATON ROUGE (LA.) ELECTRIC COMPANY

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., May, '18	\$20,455	\$11,221	\$9,234	\$3,776	\$5,458
1m., May, '17	17,792	*10,383	7,409	3,498	3,911
12m., May, '18	240,609	*125,228	115,381	43,939	71,442
12m., May, '17	221,329	*106,159	115,170	42,274	72,896

BROCKTON & PLYMOUTH STREET RAILWAY, PLYMOUTH, MASS.

1m., May, '18	\$8,692	*\$10,017	\$1,325	\$1,386	\$2,712
1m., May, '17	9,586	*10,916	†1,330	1,222	†2,552
12m., May, '18	119,714	*122,492	†2,258	15,696	†18,454
12m., May, '17	125,193	*116,962	8,231	13,653	†5,422

CAPE BRETON ELECTRIC COMPANY, LTD., SYDNEY, N. S.

1m., May, '18	\$38,916	*\$27,740	\$11,176	\$6,535	\$4,641
1m., May, '17	36,029	*25,167	10,862	6,683	4,179
12m., May, '18	483,028	*335,899	147,129	78,434	68,695
12m., May, '17	419,412	*245,679	173,733	78,741	94,992

COLUMBUS (GA.) ELECTRIC COMPANY

1m., May, '18	\$101,017	*\$38,403	\$62,614	\$33,004	\$29,610
1m., May, '17	84,410	*31,300	51,110	28,244	22,866
12m., May, '18	1,166,369	*439,522	726,847	379,937	326,910
12m., May, '17	971,048	*369,711	601,337	341,975	261,362

EASTERN TEXAS ELECTRIC COMPANY, BEAUMONT, TEX.

1m., May, '18	\$24,395	*\$33,320	\$41,075	\$13,052	\$28,023
1m., May, '17	74,232	*43,957	30,275	11,674	22,333
12m., May, '18	996,074	*534,905	441,169	149,541	314,464
12m., May, '17	893,414	*477,162	406,252	115,991	229,491

EL PASO (TEX.) ELECTRIC COMPANY

1m., May, '18	\$105,575	*\$73,101	\$32,474	\$6,645	\$25,829
1m., May, '17	101,174	*66,437	36,737	4,652	32,085
12m., May, '18	1,272,199	*830,315	446,884	74,914	371,930
12m., May, '17	1,198,303	*751,061	447,242	60,554	386,688

* Includes taxes. † Deficit. ‡ Includes non-operating income.

HOUGHTON COUNTY TRACTION COMPANY, HOUGHTON, MICH.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., May, '18	\$25,122	*\$17,118	\$8,004	\$3,009	\$2,995
1m., May, '17	26,466	*16,291	10,175	5,117	5,058
12m., May, '18	339,553	*218,696	120,859	60,702	60,157
12m., May, '17	338,980	*196,938	142,042	62,387	56,975

JACKSONVILLE (FLA.) TRACTION COMPANY

1m., May, '18	\$83,210	*\$53,601	\$27,609	\$16,822	\$10,787
1m., May, '17	56,762	*38,673	18,089	15,754	2,335
12m., May, '18	776,083	*529,673	246,410	192,257	54,153
12m., May, '17	650,994	*438,689	212,305	186,459	25,846

NORTHERN TEXAS ELECTRIC COMPANY, FORT WORTH, TEX.

1m., May, '18	\$247,016	*\$156,341	\$90,675	\$28,172	\$372,086
1m., May, '17	180,238	*109,050	71,188	29,151	42,037
12m., May, '18	2,999,061	*1,694,123	1,304,938	344,583	1,037,021
12m., May, '17	2,058,447	*1,212,833	845,614	348,814	496,800

FUJET SOUND TRACTION LIGHT & POWER COMPANY, SEATTLE, WASH.

1m., May, '18	\$919,263	*\$590,677	\$329,086	\$207,170	\$121,916
1m., May, '17	762,662	*460,938	301,724	191,344	110,380
12m., May, '18	10,329,753	*6,436,360	3,893,393	2,428,163	1,465,230
12m., May, '17	8,689,133	*5,290,270	3,398,863	2,246,576	1,150,287

SAVANNAH (GA.) ELECTRIC COMPANY

1m., May, '18	\$93,022	*\$62,857	\$30,165	\$25,106	\$5,059
1m., May, '17	74,213	*52,139	22,074	24,144	†2,070
12m., May, '18	1,053,943	*703,680	348,263	295,166	53,097
12m., May, '17	877,633	*582,620	295,213	285,654	9,559

TAMPA (FLA.) ELECTRIC COMPANY

1m., May, '18	\$82,798	*\$31,526	\$31,272	\$5,087	\$26,185
1m., May, '17	82,012	*48,366	33,646	4,370	29,276
12m., May, '18	998,742	*578,020	420,722	59,982	360,740
12m., May, '17	992,882	*539,243	453,637	52,281	401,356

Traffic and Transportation

Portland Fare Agreement

Company to Charge Five Cents on
Three Lines and Six Cents on
Others, Zones Outside

An agreement between Attorney General Sturgis of Maine and William S. Linnell representing the Cumberland County Power & Light Company, Portland, on fares for the Portland Railroad brought the hearings on the increased fares asked for by the company in a petition to the Public Utilities Commission to an end on July 24, the company agreeing to the rates of fare suggested by Robert M. Feustel, acting as engineer for the State.

PLAN OF EXPERTS ADOPTED

The Public Utilities Commission on July 27 rendered a decision ordering the adoption of the fare plan previously agreed upon. The commissioners said in their decision:

"It is believed that no individual or body of individuals is likely to devise a scheme to meet the present situation with greater success than that so constructed. It is the work of a body of experts eminently qualified by training and experience and manifestly possessing the confidence of a wide clientage, and has the approval of counsel for the public who have devoted great labor and fidelity to the interests intrusted to them. While it does not promise the amount of revenue to which the company deems itself entitled, the latter has expressed its willingness to undertake to operate under it in the hope that it may tide over the present emergency, and that this concession may be accepted by the public as an earnest that it is not insistent upon any particular plan or upon any relief which is not absolutely necessary.

SUMMARY OF PLAN

"It is not necessary to describe the plan at length—the order will be very explicit. It is sufficient to say that it retains the 5-cent base rate for three lines in Portland characterized by the greatest density and largest percentage of short rides; exacts 1 cent for a transfer from a 5-cent car, and retains the free transfer system otherwise. Outside of these three lines it fixes 6 cents as the minimum cash fare; inaugurates the 2-cent zone system beyond the minimum cash fare limit except in a few cases where it did not seem practicable to divide into such units; makes appropriate concessions in some instances, notably that of Westbrook, in consideration of the density of travel and the recent withdrawal of reduced rate tickets; removes certain discriminations now existing as to comparative haul on different lines for the same fare; recognizes to some extent

the claims of distant communities built up on the present low fares; and retains the principle of reduced rates for school tickets.

"The plan thus presented and indorsed by all of the parties will be adopted. All parties agree that its actual results can be told only by a reasonable trial. It may provide less revenue, or more, than is anticipated. It may work out entirely fair to all, or inequalities and hardships may develop. It is necessarily an experiment, as all such radical departures are, and either the company or the public may appeal to this commission for a revision or modifications after a fair trial has been given it. But a reasonable trial should be given before complaints are entertained."

Wheeling Fare Case Presented

The hearings on the applications of the Wheeling Traction Company and the Panhandle Traction Company for fare increases were held before the Public Service Commission of West Virginia during the week ended July 27. The two companies consolidated their claims for rights to increase fares 20 per cent.

Attorney M. L. Brown asked whether the company expected to be permitted to increase fares in the State of Ohio. In reply Attorney McCahill said, in his opinion, the increase in Ohio might have to be obtained through the Interstate Commerce Commission. The question then arose whether the whole matter was not one for the Interstate Commerce Commission to decide, since it involved the proposal that a passenger from Martins Ferry, Bridgeport or Bellaire to Wheeling would enjoy 5-cent transportation, as at present, while the passenger from Wheeling Island to Wheeling would be obliged to pay a 6-cent fare. Mr. McCahill said that out of courtesy to the State commission the companies had made the application for the West Virginia increase direct to the State authorities rather than go before the Interstate Commerce Commission.

Attorney Everett Moore of Moundsville made a plea before the commission for improved service, as did also Attorney Brown of McMechen. The attorneys for the companies replied that the commission was familiar with the efforts they were making to improve the service. Fifty-two new cars have been promised for delivery soon and four are already in operation.

With the closing of the companies' plea, attorneys opposing the application moved its dismissal on the ground that the need of the increased fare had not been proved. The commission asked for additional statements from the companies.

Boston Accepts Gracefully

Newspaper Comment Shows Disposition to Accept Without Question the Seven-Cent Fare

Public opinion in Boston as judged by newspaper comment shows a general realization of the need of the company for going to the 7-cent fare put into effect on Aug. 1 and a willingness to accept the decision of the board of trustees as sound and in conformity with public interest. The significant fact, of course, is that the board found the statements and claims of the company to be true; that the need for an immediate increase in fare was imperative and that in this particular case an increase to 6 cents would not meet the situation. Looked at from the broad viewpoint of the industry as a whole it would seem that this finding by a public board representing no investment but only the good of the general public can hardly be without importance to companies elsewhere, struggling desperately with problems similar to those which confronted the Boston company. Space limitations make impossible the publication of extended extracts from the editorials, but the following quotations show the trend of the comment:

"GLOBE"

"The affairs of the elevated are in the hands of men whose first consideration is not corporate, but public, interest. They have taken their action only after careful study of the elevated situation. The best we can do is to trust to their judgment."

"TRANSCRIPT"

"There will be general agreement that the trustees, in taking this course, have acted according to the necessities of the situation. Their earliest surveys of the elevated finances proved only too plainly the drastic nature of the relief which must be applied if Boston's surface and rapid-transit lines were to cease giving service at less than cost and to begin operations on the sound, economic basis described in the public control act."

"POST"

"So let us pay the extra 2 cents cheerfully in the vast and cheering hope that we shall soon get our money's worth of service on a rehabilitated and satisfactory system of transportation."

"AMERICAN"

"The need of more revenue for the road is immediate and imperative, and the trustees, in announcing the coming fare increase, have only done what they were ordered to do by the Legislature in the act which placed them in control of the line."

Later the *American* replied to an anonymous communication in which the writer took the paper to task for its comment on the new fare. The editor replied in a 24-in. editorial which he concluded by reiterating his plea to the readers to be patient.

Company to Decide for Itself

Milford, Attleboro & Woonsocket Company Given Choice of Seven-Cent Fare or Modified Zone System

The Milford, Attleboro & Woonsocket Street Railway, one of the properties controlled by the New England Investment & Security Company, has been authorized by the Public Service Commission of Massachusetts to establish a new schedule of increased fares, in a finding dated July 15. The road operates about 30 miles of single track in the territory southeast of Worcester and near the Rhode Island line, and connects with the lines of the Rhode Island Company. Fares have not been changed materially since operation began. The unit is 5 cents, and there are seven zones ranging from 5.4 to 1.3 miles in length.

The company proposed to establish a mileage system with twenty-eight zones averaging about 1 mile length each, making the rate 2.5 cents per zone, with a minimum fare of 5 cents good for a ride in any two adjacent zones. When the total fare computed shows a half-cent, the company proposed to collect the full cent. The cash fare under this plan for a ride of three zones would thus be 8 cents, rather than 7.5 cents; but provision was to be made for the sale of ten tickets for 25 cents. It was estimated that the new tariff would yield a total increase of 76.3 per cent in revenue (from \$96,810, as in 1917, to \$170,643 for 1918).

The company hoped to earn 7 per cent on its stock investment by this change in rates; and the commission concedes that under the circumstances this rate would not be unreasonable in normal times. A 5 or 6 per cent return, the board holds, should be regarded as very satisfactory under present war conditions. The increase in fares proposed by the company averages 96 per cent, and between twenty typical points the fare total is \$5.10 by the proposed rates as compared with \$2.60 under the present schedule.

The company's estimate of the revenue to be derived from the new schedule was based upon traffic conditions covering only one day; but the board is of the opinion that the estimate that the increase in revenue would amount to about 76 per cent if the traffic loss were not more than 10 per cent is not far wrong. Estimates of the gain in revenue from increases in rates, however, are most unreliable, in the experience of the commission. This company has little steam road competition, and few jitneys have operated in its territory; but the effect of a jump in rates ranging from 25 to 200 per cent is beyond calculation.

The towns in which the road operates are not opposed to a fare increase, but are all hostile to the proposed mileage system of charging. They urged that the present zones be retained and the fare unit raised from 5 to 7 cents, contending that the mileage zone system,

with its violent and disproportionate increases in the rates between the various centers, would destroy the good feeling previously existing, discourage travel, encourage every feasible form of competition and prove of little financial benefit. It was urged that there would be general willingness to pay 7 cents.

The commission concludes that the company needs additional revenue, but suggests that it be obtained either by reducing the number of zones planned between Milford and Franklin and the Rhode Island boundary, where the traffic is heaviest, and not changing the present rates; or by the adoption of the 7-cent fare unit. The advantages of the mileage zone system in relation to the development and retention of short-haul traffic are important, the commission points out, for the stimulation of short-distance travel by a low minimum fare is highly desirable.

On the other hand, a straight 7-cent fare has less disadvantage on this road than on many others, for the proportion of short-haul traffic is low and the riding is mainly between centers of population some distance apart. The commission points out that much of the trackage runs through sparsely settled territory; that the communities are accustomed to the present system of charging, apparently are satisfied with it, and by retaining this system the company could not only preserve the good feeling now existing but also save the trouble and expense of a rather complex and experimental new method of fare collection.

Upon the evidence the commission is inclined to favor giving the 7-cent fare unit a trial. It says:

"A friendly community is a better asset for a street railway than an anticipated gain in revenue, which, however reasonable it may be, is still largely a matter of uncertain speculation. However, the local management is better able to judge this question of expediency than we are. * * * The towns which the company serves ought not to forget that they have been receiving service at less than cost, including a reasonable profit to the stockholders, ever since the road began operation, and they ought not to oppose any plan which is likely to increase its prosperity and enable it to secure the credit which it will presently need."

Explains Matters to the Editors

Joseph K. Choate, chairman of the special committee on ways and means to obtain additional revenue, representing the electric railways of New York State, addressed to the editors of the daily papers throughout the State on July 31 a statement in which he said that the situation confronting the electric railways of the State was "one that

must give alarm not only to the owners and operators of these properties, but to the public as well."

Mr. Choate reviewed very briefly the trend of regulation from the passage of the public service commission laws in 1907, and pointed out the chaos which has followed the decision of the Court of Appeals in the so-called Rochester case. Mr. Choate says that the idea in establishing the commissions was to remove public utility regulation from politics, but that the effect of the decision of the Court of Appeals in the so-called Rochester case is to make regulation again a matter of politics.

As a result of the decision of the court, questions of increases in fares are now before the common councils of various cities. None of these governing bodies has the machinery or the facilities for such impartial and technical investigation of the fare question as will alone provide the proper solution of the matter.

Question of Authority Raised

Kansas City, Kan., Contends City Has Sole Right to Negotiate Any Change in Fare

Out of the effort which officials of Kansas City, Kan., are making to prevent the charging of a 6-cent fare by the Kansas City Railways has grown a controversy between the city and the Public Utilities Commission of Kansas which may have far-reaching consequences. On Aug. 8 the Supreme Court at Topeka will decide whether or not the Public Utilities Commission can hold a hearing in Kansas City, Kan., on the application of the railway for an increase in revenue in that city. Before the commission had arranged for the hearing, the city officials of Kansas City, Kan., secured a temporary injunction from the Wyandotte County Court preventing the commission from considering the facts in the case. Later E. L. Fischer, district judge, ruled out a demurrer of the utilities commission and automatically the temporary injunction was granted, and continues in effect till the case is settled in the Supreme Court. The fact that the Supreme Court recently refused to issue a writ of mandamus against Judge Fischer, maintaining that the District Court had jurisdiction in the matter, gives the city officials confidence that the decision rendered will be favorable to the city.

The commission contends that it was created by the State legislative body, and has the power to go into any county or city in the State for the purpose of holding a hearing to determine what action, if any, should be taken. It maintains that having been created by the State for the specific purpose of passing on questions of this nature, the District Court has no jurisdiction in such matters. The commission declared that the restraining order should have been against an order and that no order was issued. The indirect result would be that future acts of the

commission might be set at naught and the body shorn of its power as a rate-fixing commission.

On the other hand, the Commissioners of Kansas City, Kan., contend that the city has a franchise contract with the railway which does not expire for five or six years, in which the fare is fixed at 5 cents. They also maintain that the utilities commission has no power to come into Wyandotte County and hold a hearing to change the rates, and that as a party to the contract, the city should hear the application.

Seeks Further Increase

Springfield Street Railway, After Short Zone Trial, Will Increase Basic Fare to Six Cents.

Three months' trial of the zone system of fares on the Springfield (Mass.) Street Railway has convinced the management that the existing 5-cent fare in the central zone will have to be increased to 6 cents. A tariff embodying this change will shortly be presented to the Public Service Commission.

The present zone limits are to be retained, but various other changes in tickets and rates are scheduled. The 8½-cent tickets now entitling the holder to ride from any point within the inner zone to the limit of the outer zone are to be abandoned, and the 6½-cent tickets, used between points in the inner zone and the mid-points of the outer zone will be replaced by tickets costing 8½ cents.

It is planned to increase the rate from 2 to a basis of 2½ cents per mile on the rural lines radiating from Westfield and Palmer, but the existing 6-cent fare unit in Westfield is to remain unchanged. The new rates will probably go into effect on Sept. 1.

The Public Service Commission authorized the company to establish a zone system with a central 5-cent fare unit, in a decision issued in March, 1918, and estimated at that time that the company's annual earnings should be increased \$400,000. The quarter's trial of the zone rates shows that the maximum increase to be expected is at the rate of \$300,000 a year, and this increase will be absorbed in the recent wage increase granted the employees by Henry B. Endicott, executive manager of the Massachusetts Committee on Public Safety, who arbitrated the wage question between the union and the company and authorized increases estimated at a total of \$400,000 a year.

The company plans to sell tickets good for a 6-cent fare at the rate of seventeen for \$1. These, with the 8½-cent tickets, would be on sale at central points throughout the city, but would not be vended by conductors. The 8½-cent ticket, replacing the present 6½-cent ticket would be honored only on the line for which it was sold. In general, the new tariff will establish a fare of 6 cents on present 5-cent lines; 8½-cents on 6½-cent lines, and 11 cents on 10-cent cash and 8½-cent ticket lines.

New Boston & Worcester Schedule

Massachusetts Interurban Authorized by Public Service Commission to Charge Rate of 2.5 Cents Per Mile

A new rate schedule based upon a charge of 2½ cents per mile will shortly be approved by the Public Service Commission of Massachusetts for use by the Boston & Worcester Street Railway. The company has been notified that if it files a schedule amended according to a decision of the board dated July 16 it will be allowed to go into effect upon short notice.

Since Oct. 1, 1917, the road has been operating under a mileage zone system which was substituted for the former system of irregular and overlapping zones, in each of which the cash fare was 6 cents. The later schedule is based upon a rate of 2 cents per mile, the zones being about 1 mile long in each case, with a minimum fare of 6 cents for a ride covering three zones or less. One-hundred mile books are sold for \$1.70, round-trip tickets are sold at a discount of 15 per cent, and in Marlborough special workmen's tickets are provided at the rate of thirty for \$1.

The Public Service Commission also required the sale of twenty-trip tickets, limited to the person named, and good for one month, enabling the purchaser to ride between any two designated points on the road at a rate of 50 per cent in excess of the old cash or trip-ticket rate. It is estimated by the company that the new rates would increase revenue about \$74,000 a year.

TRIAL FOR SIX MONTHS

This schedule was approved for a six-months' experimental period. The new tariff, approved in general by the commission, leaves the mileage zones unchanged except in the increase of the base rate to 2½ cents, and makes a similar increase in all reduced-rate tickets except the workmen's tickets in Marlborough. The minimum fare of 6 cents for a ride of three zones or less is retained. It is estimated that this new tariff would increase passenger earnings not more than \$146,830. The results from the schedule effective last fall have been disappointing, but in the company's opinion this is due to the weather conditions last winter and to changes resulting from the war.

There are some apparent inconsistencies in the new schedule. One is the minimum fare of 6 cents for a ride of three zones or less, as a result of which the fare jumps suddenly in the fourth zone from 6 to 10 cents. The commission intimates that a more logical minimum would be 5 cents for a ride of two zones or less. The company states, however, that in view of its high-speed operation it would be difficult to collect fares within a space of two zones on certain portions of the line.

The principal change in the tariff required by the commission is in connection with fares between Chestnut Hill and the Overbrook section of Wel-

lesley. The company proposed to establish a cash fare of 20 cents per ride, a mileage rate of 17 cents, and a twenty-ride monthly ticket rate of 14½ cents. The present monthly ticket rate is 11¼ cents. This is the only section served by the road in which commutation business is a main factor in the travel, and the commission feels that commutation rates should be retained between points where the present twenty-trip tickets are available, selling these tickets, however, on the basis of fifty rides instead of twenty rides per month. This will confine their use more certainly to the regular riders to whom it is reasonable to make this concession, and while the sale of such tickets is a departure from the logical mileage zone system, it meets a real need, especially in view of the federal railroad administration's disinclination to raise commutation rates by radical amounts.

Wants Ten-Cent Cash City Fare

The Ithaca (N. Y.) Traction Corporation recently filed with the Public Service Commission for the Second District of New York a supplemental petition in which it asks that "the rate, fare or charge to be received by your petitioner within the limits of cities and incorporated villages shall be 10 cents per passenger or that received by the sale of ticket representing twelve for \$1."

The commission will give a hearing upon the petition.

The Ithaca Company, in 1917, asked permission to increase its rate of fare in Ithaca from 5 cents to 7 cents. There were no restrictions in the franchises held by the company and the commission on Nov. 21 approved an increase to 6 cents.

Accompanying the petition just filed were statements by the company giving the value of the property used in the public service, income, schedule of prices of labor and material from 1910 to March 1, 1918, and other information upon which it makes its petition for a 10-cent fare.

Cities Attack Fares in Court

The hearing of the appeals of the cities of St. Louis and Kansas City from the Public Service Commission rulings granting increased rates from 5 to 6 cents to the United Railways, St. Louis, and the Kansas City Railways, were begun at Jefferson City, Mo., on July 22 before Judge John G. Slate. The two cases are being heard at the same time.

Both cities are attacking the jurisdiction of the Public Service Commission, their arguments being that the commission has no right or authority to increase street railway fares.

Six Cents for Fishkill

Permission to charge a 6-cent fare was granted by the Public Service Commission of the Second District of New York on July 25 to the Fishkill Electric Railway. The company operates in Beacon to Fishkill with a branch extending to the foot of Mount Beacon. The road is divided into two fare zones. A 5-cent fare has been charged in each zone, but under the commission's order, effective on five days' notice, the zone fares will be increased to 6 cents. The commission holds that present rates of fare "are unjust and unreasonable for the reason that they are insufficient to yield a fair return on the value of the property used in the public service."

The investigation by the commission disclosed that there were no franchise restrictions fixing rates of fare and no opposition to the company's petition developed. In concluding its finding the commission said:

"While the increase of fare asked for will probably not permit of any dividends to stockholders, it should be granted, and although the method by which the determination is arrived at can hardly be said to be strictly scientific, it will probably afford temporary relief and permit this road to continue to serve the public in these abnormal times."

Hearing on New York City Fares

The committee on franchises of the Board of Estimate of New York City on July 27 heard argument in favor of the application of the New York Railways for permission to charge 6 cents on its lines during the war and for one year thereafter, should the Public Service Commission give its assent.

Henry J. Smith, counsel for the company, was questioned by Mayor Hylan, chairman of the committee, and by City Comptroller Craig concerning rents paid to underlying companies. These he explained after the fashion of Mr. Shonts, president of the company, in the statement published in the *ELECTRIC RAILWAY JOURNAL* for July 27, page 171. Mr. Smith said that the rate of fare received by the company was only 3.6 cents instead of 5 cents, because of the transfers that the company was compelled to issue. The Mayor suggested that the company use its influence with the stockholders of the leased lines to accept lower rentals.

Timothy S. Williams, president of the Brooklyn Rapid Transit Company, read a statement to the effect that if the company was not allowed to charge a 7-cent fare on its surface lines it would be compelled to go back to the zoning system. If the zoning system was restored it would cost as much as 15 cents to make a trip in Brooklyn where the cost now was 5 cents.

Assemblyman Mark Goldberg appeared in opposition. He stated that the American Federation of Labor was against the increase and that the company's employees did not accurately represent the sentiment of workmen.

Transportation News Notes

Skip Stops in Springfield.—The skip-stop system will be adopted in Springfield, Ill., according to an announcement from the office of the Springfield Consolidated Railway.

Five-Cent Fare for Rockford.—The Public Utility Commission of Illinois has authorized the Rockford City Traction Company to charge a straight 5-cent fare for adults. School children will pay a fare of 2½ cents.

New East St. Louis Fare Suspended.—The Public Utility Commission of Illinois has suspended until Nov. 18 the proposed increase in fares asked by the East St. Louis (Ill.) Railway. The company asked a rate of 7 cents.

Nashua Tariff Suspended.—The Public Service Commission of New Hampshire on July 11 notified the Nashua Street Railway that it has suspended until Sept. 1 the increase in fares and schedule changes of the road, proposed to be put into effect on July 13 pending a hearing.

Steam Rates Allowed.—Authorization of the Director General of Railroads to the Electric Short Line St. Paul, Minn., to increase its rates to accord with those charged by the steam lines under federal control has been approved by the Railroad & Warehouse Commission of Minnesota.

Court Prevents Interference With Fares.—Federal Judge H. C. Niles has issued an order restraining the city officials of Meridian, Miss., from interfering with the Meridian Light & Railway Company in raising fares to 7 cents, and increasing the electric light and power rates 28 to 40 per cent and gas rates 30 per cent.

North Shore Appeals to the I. C. C.—Permission to increase its ticket fares from 2 to 2.6 cents per mile and to increase its cash fares to 3 cents per mile between points in Illinois and Wisconsin, was asked of the Interstate Commerce Commission on July 19 by the Chicago, North Shore & Milwaukee Railroad, Elmhurst, Ill.

Law Stands in Way of Fare Increase.—On applying to the Commissioners of Franklin County, Ohio, for an increase in the rates of fare, the Columbus & Southern Traction Company was referred to Assistant Prosecuting Attorney J. H. Summers, who advised that the law does not permit the commissioners to change the terms of franchises.

City Will Not Object.—The City Council of Boulder, Col., on July 16 decided not to interfere in the application made by the Denver & Interurban Railway for the right to increase fares between Boulder and Denver. The

Council also will not insist upon running the full number of cars required by the company charter, which will be quiescent during the war.

Albany Southern Tariff Put Over.—The Albany (N. Y.) Southern Railroad on July 22 filed with the Public Service Commission for the Second District, notice that its increased rate schedule, which it intended to put into effect on Aug. 4, will not become effective until Sept. 1. The schedule, filed on July 5, increased one-way and round-trip fares between Albany and various points on the road.

San Antonio Wants Fare Increase.—The San Antonio (Tex.) Public Service Corporation is planning to make application to the City Council for a permit to increase its railway rates to 6 cents or establish the zone system, limiting the distance to be traveled on a single 5-cent fare. Notice of this fact has been conveyed to Mayor Bell by W. B. Tuttle, vice-president and general manager for the company.

Buffalo Fare Referendum on Aug. 20.—The special election on the 6-cent fare agreement with the International Railway will be held on Aug. 20. The date was fixed by the City Council on July 24 after the petition for a repeal of the fare resolution was denied. The proceedings which resulted in the fare matter being submitted to a vote have been reviewed from time to time in the *ELECTRIC RAILWAY JOURNAL*.

Must Show Proof.—The Western New York & Pennsylvania Traction Company, Olean, N. Y., will be asked to show proof of necessity in the matter of the proposed increased fares at a hearing before the Public Service Commission for the Second District. The company is seeking to increase its city fares in Olean from 5 cents to 7 cents. The investigation was asked by the Common Council of Olean.

No Women in Des Moines.—The Des Moines (Iowa) City Railway is giving little attention to using women as conductors. The franchise which the company secured a few years ago provides that the cars shall be operated by two men, and as long as the labor situation does not become any more critical than it is at present no attempt will be made by officials of the company to secure relief from this feature of the franchise.

Zone Modifications in Providence.—In compliance with petitions filed by patrons, officials of the Rhode Island Company, Providence, R. I., have agreed to extensions of the 5-cent fare limits on three lines of the road. The objections to the previous limitations on the distance which the 5-cent fare represented were chiefly that hardship was imposed upon passengers living just beyond the zone line and required to pay an extra 2-cent fare.

Skip-Stop Results in Des Moines.—The first month's trial of the skip-stop plan on the Sixth Avenue line has been entirely satisfactory to the Des Moines (Iowa) City Railway. According to the

report submitted to the City Council by Car Supervisor Smock two minutes have been cut from the running time of the cars on the Sixth Avenue line during the regular hours, and during the rush hours the plan has provided car capacity for eighty more passengers per hour.

Hearing on Transfer Charge Postponed.—The Public Utilities Commission of Illinois has postponed until Sept. 23 the hearing on the petition of the Peoria Railway to charge 2 cents for transfers. The company wished to proceed with the case at once, but after conference between counsel, it was decided to delay the hearing. The granting of a straight 5-cent fare to the company was noted in the *ELECTRIC RAILWAY JOURNAL* for July 20, page 135.

Skip Stops for Chicago.—Skip-stop operation for the Chicago Surface Lines was approved by the City Council on July 17, and is scheduled to go into effect within a few weeks. It is estimated that the plan will eliminate about 30 per cent of present stops. The ordinance provides for eight stops per mile, the places being where house numbers are "100" or multiples thereof. A penalty of from \$10 to \$25 is fixed for any person or corporation violating the ordinance.

Class and Express Rates Advanced.—The Reading Transit & Light Company, Reading, Pa., on July 23 filed with the Public Service Commission a supplement to its tariff of class and express rates, becoming effective on Aug. 12, and making the following changes: All class rates increased 25 per cent, minimum express charge increased, rates for milk in cans increased. Maximum weight of express shipments under graduation changed from 50 lb. to 20 lb.

A. C. Ventnor Fare Six Cents.—Clarence I. Cole, receiver of the Atlantic City & Shore Railroad, has notified the authorities of Ventnor, N. J., of the company's intention to increase the fare from Atlantic City to Ventnor City from 5 cents to 6 cents on Aug. 6. He says the railroad wants to increase the income so that the receivership can be lifted. The company some time ago agreed to extend the 5-cent zone system twelve blocks further down the beach after a lapse of ten years.

Mr. McCarter's Statement Reproduced.—The Montreal (Que.) Tramways reproduced as an advertisement in the *Montreal Gazette* of July 24 the statement on the preservation of utilities which was made by President Thomas N. McCarter of the Public Service Railway, Newark, N. J., chairman of the American Electric Railway Association War Board, to the *ELECTRIC RAILWAY JOURNAL* and published in this paper for July 13, page 43. The advertisement was three columns wide and a full page in depth.

Feels Vote Necessary.—It was announced on July 22 that the City Commission of Kalamazoo, Mich., would not grant the Michigan Railway permission to increase its fares on the Kalamazoo

city lines to 6 cents. This action was taken after a committee from the commission investigated the railway's claims. It was found that while an advance may be warranted at this time, the commission was not authorized under the new city charter to grant such an advance without the proposition going to a vote of the people.

Complete Control of Jitneys Recommended.—Mayor Ole Hanson, Seattle, Wash., recently received a report of the committee which he appointed to investigate jitney conditions in Seattle. The committee report asks city regulation of all jitneys, and suggests that the work be placed under direction of some city department subject to approval of the Board of Public Works. The committee prepared its report after six public hearings had been held, and thorough investigation made into the jitney and traffic situation in Seattle.

Fare Petition Withdrawn.—The Public Service Commission for the Second District of New York on July 25 granted the request of the Corning & Painted Post Railway to withdraw the petition asking for a 6-cent fare in cities and incorporated villages in which it operates. The company operates in Corning and Painted Post under franchise fare limitations coming within the decision of the Court of Appeals in the Rochester rate case and for this reason the attorneys for the road requested permission to withdraw the increased fare petition.

Still Fighting at Columbus on Service.—At the regular meeting of the City Council of Columbus, Ohio, on July 22, a resolution was unanimously adopted providing for the appointment of two car inspectors, whose duty will be to check up the cars and ascertain whether the Columbus Railway, Power & Light Company is operating according to the terms of the franchise. The company has been insisting upon an increase in the rate of fare for some time in order that it may give full and sufficient service and make such improvements as are necessary.

Abolition of Tickets Upheld.—The Supreme Court at Olympia, Wash., recently held that the Public Service Commission was within its legal rights when it abolished the 4-cent tickets in Seattle. The Supreme Court's decision states that the Public Service Commission has no authority to change or to relieve the company of franchise provisions not relating to rates, but that the commission law gives power to fix reasonable rates. The commission could not interfere with paving or bridge provisions or with the gross revenue tax, but can regulate rates up to 5 cents.

Twin City Lines Will Run Jitneys.—The Minneapolis (Minn.) Street Railway has been authorized to operate the jitney buses in Minneapolis and has acquired the thirty-nine buses in operation at a reported cost of \$200,000. Except on request of a majority of citizens on the street no new jitney license will be granted for five years. It is not

proposed to duplicate travel by having jitneys on the same streets as trolley cars, but the North Side, which is now reached in a roundabout way by several lines, will profit by the new jitney service. Transfers will be given.

Jamestown Transfer Arrangement Canceled.—The Chautauqua Traction Company, Jamestown, N. Y., in a new tariff schedule filed with the Public Service Commission for the Second District of New York, will cancel all transfer arrangements between the company and the Jamestown Street Railway beginning on Aug. 1. The traction company will not accept transfers from nor give transfers to the Jamestown city lines of the Jamestown Street Railway. The Chautauqua Traction Company operates an interurban line along the shores of Chautauqua Lake between Jamestown and Mayville and other Chautauqua County points.

Slight Fare Change Approved.—The Public Utilities Commission of Illinois has announced an increase in fares on the St. Louis-Alton interurban line of the East St. Louis & Suburban Railway. It changes the rule of charging a fixed fare from one station to another, and places the fare on a mileage basis. The rate will be 2 cents a mile for persons who buy tickets and for persons who pay cash fare when getting on at stations where there are no ticket offices. Those who board cars where there are ticket offices, and fail to buy tickets, must pay a cash fare at the rate of 3 cents a mile. The commission deferred a 10 per cent increase on commutation books until Nov. 21.

Trenton Fare Briefs Submitted.—Briefs for and against the application of the Trenton & Mercer County Traction Corporation, Trenton, N. J., for the elimination of six-for-a-quarter tickets and the charging of a 6-cent fare were submitted to the Board of Public Utilities Commissioners on July 16 by the company and by the city. The city's brief was filed by Charles E. Bird, city counsel, and George L. Record, special counsel for the city. The company's brief was filed by Frank S. Katzenbach, Jr., and Edward M. Hunt for the company. The final argument in the case was reviewed in the *ELECTRIC RAILWAY JOURNAL* for July 20.

Special Industrial Service With Women.—Women conductors made their appearance in Indianapolis on the morning of July 15, running between the downtown district and the plant of the Nordyke & Marmon Company. Arrangements have been made between the Indianapolis Traction & Terminal Company, operating the local lines in Indianapolis, and the Nordyke & Marmon Company whereby ten cars are to be used on the Kentucky Avenue line, the crews to be paid for by the Nordyke & Marmon Company. The cars will be in service from 6.15 to 8.15 o'clock in the morning and from 4.30 to 8.30 in the evening. The motormen will be selected from employees of the Nordyke & Marmon Company who have had railway experience.

Personal Mention

R. I. Brown has been appointed commercial manager of the Little Rock Railway & Electric Company, Little Rock, Ark., to succeed A. E. Smith.

W. H. Curtis has been appointed master mechanic of the Little Rock Railway & Electric Company, Little Rock, Ark., to succeed A. R. Koonce.

Thomas M. Paterson, president of the Fresno (Cal.) Interurban Railway, has also been appointed general manager of the company to succeed J. J. Mahoney.

F. L. Farrell has been appointed claim agent and general freight and passenger agent of the Fresno (Cal.) Interurban Railway to succeed M. I. Dohner.

J. A. Walden has been appointed general freight and passenger agent and claim agent of the Ocean Shore Railroad, San Francisco, Cal., to succeed I. N. Randall.

N. D. Moore, formerly chief engineer of the Pacific Coast Railway, Seattle, Wash., has been appointed first vice-president of the company to succeed W. M. Barnum.

George P. McNear, treasurer of the Petaluma & Santa Rosa Railway, Petaluma, Cal., has also been elected first vice-president of the company to succeed E. T. McMurray.

J. M. Sims, superintendent and general freight and passenger agent of the Pacific Coast Railway, Seattle, Wash., has also been appointed claim agent to succeed H. M. Watkins.

James T. Price has resigned as master mechanic and roadmaster of the Lincoln (Ill.) Municipal Street Railway to become connected with the Vesta Battery Company at Pittsburgh, Pa.

F. A. Riehle has been appointed secretary of the Los Angeles & San Diego Beach Railway, San Diego, Cal., to succeed W. R. Lyon, who retains the title of vice-president and purchasing agent.

Thomas N. McCarter, president of the Public Service Railway, Newark, N. J., has resigned as a member of the New Jersey Bridge & Tunnel Commission because of the pressure of other business. Governor Edge has accepted the resignation.

H. M. Watkins, formerly auditor and chief engineer of the Pacific Coast Railway, Seattle, Wash., has relinquished his position as claim agent, and in addition to being auditor has been appointed secretary of the company to succeed J. W. Smith.

D. C. Green, vice-president of the Fort Smith-Oklahoma Light & Traction Company, Fort Smith, Ark., has also been appointed general manager of the company. The office of general manager was formerly held by R. E.

Ballard in conjunction with his duties as president of the company.

J. J. Caufield, general superintendent for the Twin City Lines, Minneapolis, Minn., on Aug. 1, also became superintendent of the St. Paul City Railway, taking over the duties of G. O. House, who has been appointed to the Northern States Power Company as noted in the ELECTRIC RAILWAY JOURNAL for July 27.

George W. Buchanan has resigned as assistant secretary and assistant treasurer of the Chattanooga Railway & Light Company, the Lookout Incline Railway and the Lookout Mountain Railway, Chattanooga, Tenn., effective on Aug. 1, to accept a position with the Wright-Martin Air Craft Corporation at New Brunswick, N. J.

C. M. Marsh, recently appointed general superintendent of the Wheeling (W. Va.) Traction Company, has been connected with the company and its predecessors since 1888, when he entered the service as a shopman. Later he served as motorman and then as conductor. In 1902 he was appointed dispatcher. In 1904 Mr. Marsh became superintendent of transportation. He continued in that capacity for twelve years and was then made assistant general superintendent, from which post he was advanced to general superintendent.

Samuel H. Ordway, New York City, has been named by Governor Whitman as a member of the Public Service Commission for the First District of New York to fill the vacancy caused by the resignation of Oscar S. Straus. Mr. Ordway was formerly president of the State Civil Service Commission, under appointment of Governor Whitman. Before holding that office he was chairman of the executive committee of the State Civil Service Reform Association. Mr. Ordway was a member of the law firm of Spencer, Ordway & Wierum, and has been active in civil service reform work for several years.

Charles Bulkley Hubbell has been designated by Governor Whitman as chairman of the Public Service Commission for the First District of New York to succeed Oscar S. Straus, resigned. Mr. Hubbell was born in Williamstown, Mass., on July 20, 1853. He was graduated from Williams College in 1874, and then practiced law in New York until 1913, when he retired. In 1889 he was appointed to the Board of Education. He served three terms, and became president of the Borough Board of Education. He has served on three subway commissions, and has made a close study of rapid transit problems.

E. E. Lillie, for several years superintendent of the Spokane traction di-

vision of the Spokane & Inland Empire Railroad, Spokane, Wash., has been attached to the Portland office of the Spokane, Portland & Seattle Railway as assistant federal manager. Mr. Lillie was formerly superintendent of the telegraph and car service for the Spokane, Portland & Seattle Railway, taking that position when the line was built. Later he was made superintendent of the Inland Empire line. Subsequently he was made superintendent of the telegraphic service for the Great Northern and again went back to the Inland Empire as superintendent.

F. S. Elliott has been elected president of the Spokane & Inland Empire Railroad, Spokane, Wash. He will have his office at the Spokane terminal, coming from Portland to assume charge. This brings the president of the Inland Empire System to Spokane for the first time since Jay P. Graves sold his control and resigned the presidency. This condition has resulted from the fact that the president of the Spokane, Portland & Seattle Railroad, who is also president of this line, has always been stationed at Portland. Mr. Elliott was formerly general superintendent of the lakes district for the Great Northern, with headquarters at Superior, Wis.

Milan V. Ayres has resigned from the division of valuation, Interstate Commerce Commission, to become a major in the National Army. Mr. Ayres was born in Kansas in 1875 and was graduated from the Massachusetts Institute of Technology in 1898. He is well known in electric railway and electric light circles through his connection with the Boston & Worcester Street Railway, the Rockland Light & Power Company and Ford, Bacon & Davis and through his affiliation with the American Institute of Electrical Engineers, American Electric Railway Association, American Statistical Association, New England Street Railway Club and the New England Railroad Club.

Obituary

Thomas J. Marlow, for thirty years superintendent of track construction for the Des Moines (Iowa) City Railway, died on July 20 from cancer of the stomach. Mr. Marlow was fifty-seven years of age. He had lived in Des Moines for forty-five years.

First Lieut. Warren Harries, son of General George Herbert Harries of Washington and Louisville, Ky., was killed in an automobile accident, on July 25, in France where he was on duty. Lieutenant Harries has been acting as an aid on the staff of his father, Brigadier-General George Herbert Harries, who has charge of one of the debarkation zones for American forces in France.

Construction News

Construction News Notes are classified under each heading alphabetically by States. An asterisk (*) indicates a project not previously reported.

Franchises

Los Angeles, Cal.—The City Council of Los Angeles has granted a franchise to the Pacific Electric Railway over a short strip of land between 116th and 117th Streets and over a portion of Vermont Avenue, connecting its track with those of the Los Angeles Railway.

Track and Roadway

Muscle Shoals Traction Company, Florence, Ala.—A contract has been awarded by the Muscle Shoals Traction Company to the firm of Waddell & Son, consulting engineers of Kansas City and New York, for the survey and for the supervision of construction of the line the company proposes to build from Huntsville to Florence, via Athens, 65 miles. They will also aid in financing the enterprise. A branch line will be built to Lexington, 12 miles, and will furnish transportation facilities to the site of Dam No. 3. Construction will be begun at both terminals. It is estimated that the main line will be completed within a year. Preliminary surveys are now being made. The consent of the United States Railroad Administration will have to be obtained before the work can be begun. Thurston Allen, Florence, secretary. [March 2, '18.]

Tucson (Ariz.) Rapid Transit Company.—An extension will be built by the Tucson Rapid Transit Company of its University Avenue line from its present terminus at the University campus main entrance, along Park Avenue to East Sixth Street, along Sixth Street to North Fourth Avenue, and south on North Fourth Avenue to and through the subway, connecting with the South Fourth Avenue line.

Municipal Railways of San Francisco, San Francisco, Cal.—The Board of Public Works of San Francisco has awarded a contract to A. J. Raisch for the construction of the Taraval line of the Municipal Railways.

***Baton Rouge, La.**—Following the passage of an act by the Legislature at its recent session empowering municipalities in Louisiana to combine and co-operate with each other in the construction, ownership and operation of interurban railways, John B. Rucker, manager of the traffic bureau of the Baton Rouge Chamber of Commerce, has taken steps to effect organization

of the business and commercial interests of the different cities and towns in order to lay the groundwork for the construction of interurban lines throughout the State as soon as the war situation adjusts itself so that bonds can be floated and material secured for construction purposes.

Indian Head, Md.—It is reported that a contract has been awarded by the Bureau of Yards and Docks of the United States Navy Department, Washington, to the New Jersey Cement Construction Company, Newark, N. J., for the construction of the proposed railway from White Plains to Indian Head, 14½ miles. [July 6, '18.]

Public Service Railway, Newark, N. J.—The Public Service Railway is laying new tracks and making other improvements on the court house division at Somerville.

Westchester Street Railroad, White Plains, N. Y.—Application has been made by the Westchester Street Railroad to the Public Service Commission for the Second District of New York for its approval of the abandonment of a part of its line in the town of Greenburgh.

Tidewater Power Company, Wilmington, N. C.—It has been announced that financing has been arranged for the construction of an extension by the Tidewater Power Company to the new shipbuilding plant.

Toledo Railways & Light Company, Toledo, Ohio.—Plans are being made by the Toledo Railways & Light Company for the construction of an extension to the proposed site of a new nitrate plant at Ironton.

South Bethlehem & Saucon Street Railway, South Bethlehem, Pa.—A report from this company states that during the next three weeks it expects to place contracts for 1 mile of signal equipment, 1 mile of brick paving and 1 ton of railway spikes.

South Carolina Light, Power & Railways Company, Spartanburg, S. C.—An extension will be built by the South Carolina Light, Power & Railways Company to Whitney and Converse.

Mount Vernon & Camp Humphries Railway, Mount Vernon, Va.—Construction work has been begun by the Mount Vernon & Camp Humphries Railway on its line from Mount Vernon to Camp Humphries, and it is expected that the line will be completed in about a month. James R. Caton, Alexandria, president. [June 8, '18.]

Seattle (Wash.) Municipal Railway.—The City Council of Seattle recently passed an ordinance authorizing the Board of Public Works to spend \$9,500 in double-tracking the municipal street car line from Twentieth Avenue N. W. and Leary Avenue to Twenty-second

Avenue N. W. and West Sixty-fourth Street. The Council also authorized the expenditure of \$1200 for rehabilitating the Loyal Railway division of the municipal line.

Shops and Buildings

Washington, Baltimore & Annapolis Electric Railway, Baltimore, Md.—Work will soon be begun by the Washington, Baltimore & Annapolis Electric Railway on the construction of a new freight terminal on the property recently acquired by it at Eutaw, Lombard, Howard and Pratt Streets.

Interborough Rapid Transit Company, New York, N. Y.—Bids will be received by the Interborough Rapid Transit Company at the office of the chief engineer, 165 Broadway, until Aug. 9 for completion of the passenger station electric lighting and electric heating systems for portions of a rapid transit railroad in the boroughs of Brooklyn and Manhattan, as follows: Portion of Clark Street, Eastern Parkway line and Nostrand Avenue lines. Further information, specifications, etc., may be obtained at the above office. George H. Pegram is chief engineer.

Wheeling (W. Va.) Traction Company.—Bids will be asked by the Wheeling Traction Company for the construction of a new carhouse at Wheeling Island in place of the one destroyed by fire on Feb. 4. At the same time the company will ask for bids for the construction of a one-story shop about 125 ft. square, to be built at its Wheeling Island station.

Power Houses and Substations

Pine Bluff (Ark.) Company.—Contracts will be placed during the next thirty days by the Pine Bluff Company for two 500 or 600-hp. high-pressure water-tube boilers, with stokers.

Philadelphia & Western Railway, Upper Darby, Pa.—This company reports that during the next three weeks it expects to place contracts for the construction of two new substations and will purchase seven 750-kw. rotaries complete.

Charleston-Dunbar Traction Company, Charleston, W. Va.—Excavation work has been begun for the foundation of a new power house for the Charleston-Dunbar Traction Company, the old power house of the company having been destroyed by fire in December, 1917. The new structure will have a floor space of 50 ft. x 92 ft., and will be fireproof. The company has arranged to increase the capacity of the plant in order to take care of increased business on the traction line and to meet a heavier demand for the electric lighting system of Dunbar. It is expected the plant will be completed by Nov. 1.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS

FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES • MARKET QUOTATIONS • BUSINESS ANNOUNCEMENTS

Shortage of Spools and Reels for Wire and Cable

Explanations of Low Stocks—Trade Accumulations Fail to Meet Demand—Metal Devices Substituted

Attention was recently called to what may be considered a minor but is yet an important phase of the electrical trade in the rather acute shortage of spools for magnet wire. The shortage is ascribed to various causes. A great deal of magnet wire has been exported, but the spools were not expected to be sent back, as is the custom in the domestic trade. The war created a heavy demand abroad, but the restraints recently placed on exportations, even to neutral countries, has reduced this business to a minimum. Attempts to ship magnet wire in coils proved a failure and were abandoned, as the insulation was affected by moisture during the sea voyage and the rough handling in stowing and discharging cargo. Spools had therefore to be employed with the package wrapped in a metal casing.

The practice is to charge the full value of spools in the invoice, with credits given when they are returned. Ordinarily the spools were shipped back within a few weeks, but with the freight congestion six months and more would pass before they reached their destination. A year ago the spool shortage was more acute than now. Conditions at the present time, however, are such that the market is being combed to obtain a sufficient supply. Some wire manufacturers and distributors are experiencing more difficulty than others in gathering a sufficient assortment of spools to meet the demand, and this may possibly lead to a higher price for magnet wire.

Substitutes for basswood and pine spools are being used with marked success. Two large Eastern manufacturers are using a copper-plated steel spool with a welded reinforced head, which far outlasts the wooden kind and is claimed to be safer and more economical in the long run. A compressed-paper spool has also been tested, but, though answering for small weights of about 5 lb., those who have given it a trial say it does not serve for 50 lb., the usual quantity sold the trade.

A shortage of reels for lead cable also exists in some quarters of the manufacturing field. As the government now controls the output of lumber, assertions are made that this is the basic reason for the curtailment in the supply. A recent government order called for reels made up on special specifications for which a priority order

had to be obtained to secure the particular lumber designated. It has been said, moreover, that the government is buying cable reel and all. As a result the reels are not as a rule returned to the jobber.

Higher Prices of Traction Material

Malleable Iron Situation Serious—Frogs, Switches, Crossings, etc., on a Rising Market

In their applications for an increase of fares to public service commissions and other state boards and officials, traction road managers and executives have submitted tabulated increases of cost in the price of rolling stock, general equipment and every class of material necessarily entering into the practical operation of their properties, several of which have appeared in this department of the *ELECTRIC RAILWAY JOURNAL*. On many items the advances have been startling. Increases are still being made and, judging from what the manufacturers say, there is no end in sight of these revisions upward.

On July 25 frogs, switches and all overhead material were advanced 15 per cent by a Middle Western company. Bonds went up 7½ per cent three weeks ago. Deliveries are being made out of stock. Another company announced an advance on frogs and crossings of 25 per cent on July 1. The last increase in switches was made about four months ago, the average being 25 per cent over the quotations in the spring. The shortage in malleable iron for line material is making for higher costs of production and consequently in the selling price. The government has taken over the entire output of three malleable iron foundries, and therefore the needful requirements of the manufacturers of railway equipment are accordingly restricted.

Just what will be done with prices on car window glass no one seems to be sufficiently informed to venture an opinion. Sales at present are slow at figures which have prevailed since February last. The production of window glass for 1918-1919 is likely to be further restricted. With the continuation of the war the plants might be forced to close down entirely, excepting at isolated works where the labor and transportation difficulties are not so acute. There is every indication that the current high prices will continue, owing to the scarcity of stock in the hands of jobbers—the main avenue of railway trade distribution—and the lack of reserve at the plants.

Restriction of Rattan Imports Affects Car Seatings

Also Track Sweepers and Brooms—War Trade Board Revokes Shipping License Aug. 5

By a ruling of the War Trade Board on July 26 rattans and reeds are placed on the restricted import list. All outstanding licenses have been revoked as to ocean shipments made after Aug. 5, 1918. Hereafter no licenses for the importation of rattans and reeds will be issued, except for shipments from Canada or Mexico by other than ocean transportation and except, further, for shipments coming as return cargo from convenient European ports or from convenient Mediterranean North African ports, and then only when coming from a convenient port where loading can be done without delay.

In effect this means a sharp curtailment of the supply of rattan for car seatings or webbing, revolving brushes for snow sweepers and track brooms, with probably an advance in price. The last increase made by the manufacturers of rattan seats for electric passenger cars, and also brushes and brooms, was made in March last, when 10 to 15 per cent was added. Rattan, in a year's time, has gone up more than 100 per cent. Normally the price is 14 to 15 cents a pound; now it sells for 33 to 35 cents.

The ruling of the War Trade Board came as a surprise to the makers in the lines specified, and it is probable a representation will be made to the authorities either to modify the order or rescind it altogether. Rattan, the major portion of which comes from Singapore, Straits Settlements, a British possession, is used in various ways besides in the manufacture of car seats and track cleaning equipment. When the British government prohibited the shipping of rattan the car seat manufacturers and other industries interested succeeded in having the restriction removed.

Conservation of tonnage is the objective of the War Board ruling, and, of course, on this score its action may not be reversed. Inquiry has disclosed that while the market for rattan and reed has recently been extraordinarily active, car seating manufacturers have strong stocks in warehouse and heavy shipments en route to American ports. The other lines are not so fortunately placed, but their requirements are smaller. With the retrenchment in the purchase of cars, especially within the past six months, the greater part being orders emanating from the United States Shipping Board Emer-

agency Fleet Corporation, buying has been comparatively quiet on the part of the electric railways.

Of course, the ruling has caused some concern in car building and supplies circles, but unless a brisk demand springs up for rolling stock between now and the close of the year the manufacturers are reported as being in a fair position to meet the supply. The other branches will not be hit so hard, although they are already making inquiries for rattan stock. Substitutes are generally being discussed as the inevitable result of the threatened shortage, in the event that rattan should become impossible to obtain, excepting at prohibitive figures.

Conversion to War Work of Less Essential Industry

Regional Organizations Present New Requirements in the War Program as They Arise

A great many classes of manufacturers are by their very nature in what might be termed a less essential group. Some of these are automatically suffering a decrease in output owing to decreased demand. Others are having their output curtailed because the government will permit them to use only a limited amount of fuel and is making it difficult for them to obtain raw materials.

In either case it will be of particular interest to a number of manufacturing concerns engaged in producing electric railway materials to note that the government has taken steps through regional organizations in the twenty regions into which the country has been divided to permit plans thus slowed down to continue to operate by diverting their machinery to more essential work.

The object of these regional organizations is to furnish the government with the necessary knowledge of national conditions in providing new resources and converting industries to war work. As the various departments of the government develop new requirements in the war program, they are presented to the business men of the country through these regional organizations.

As an indication of what is possible in the conversion of industry to meet war requirements and of the changes which can be made in the product of a factory, a few radical instances may be related. For instance, a Pennsylvania factory that formerly made lineoleum in now machining 4.7-in. shells. A Duluth horseshoe manufacturer is turning out trench picks for the army, and a New Jersey terra-cotta tile concern is making dummy drop bombs. A Milwaukee factory, the former output of which was rowboat motors, is making hand grenades and trench pumps. In Rhode Island a manufacturer of finger rings has turned his activities to making adapter plugs. A Detroit stove concern is producing trench bombs and anchor parts. Instances of this sort might be multiplied indefinitely.

Output of Coal Is Holding a High Record

Shipments of Bituminous and Anthracite Increasing—Object of the Fuel Administration

The weekly report on the production and shipments of bituminous and anthracite coal, compiled by the United States Geological Survey, ending July 27, indicates that bituminous production during the week of July 20 while not equaling the record week of July 13 was higher than any previous week. The output during the week ended July 20 (including lignite and coal made into coke) is estimated at 12,950,000 net tons as against 13,273,000 net tons during the week preceding or a decrease of 2.4 per cent; and as against 11,230,000 during the current week of 1917 or an increase of 15.3 per cent. The average production per working day during the week of July 20 is estimated at 2,159,000 net tons as against 2,212,000 tons during the week previous and 1,872,000 tons for the week in 1917.

Anthracite shipments during the week ended July 20 declined 1755 carloads or 4.2 per cent compared with the week preceding, the total movements amounting to 40,664 carloads.

The United States Fuel Administration issues the following: "The aim of the United States Fuel Administration to accomplish the movement of two-thirds of the annual anthracite allotment to New England before the winter season begins is being steadily realized. For the months of April, May and June shipments into New England amounted to approximately 3,250,000 gross tons. The total allotment for the New England States for the year amounts to 10,331,000 gross tons.

"Equalization as between communities and dealers will not be difficult once the coal moves through the New York 'bottle necks.' New York City received during April, May and June slightly more than its allotment for the three months." So far eight months' shipping has been accomplished in seven months, with indications of continued improvement.

Rolling Stock

Schuylkill Railway, Girardville, Pa., expects to purchase GE-247 motors.

Southern Cambria Railway, Johnstown, Pa., expects to purchase one double-end control for a 25-ton freight car.

Portland Railway, Light & Power Company, Portland, Ore., has purchased a lot of new Birney one-man cars.

Monongahela Valley Traction Company, Fairmont, W. Va., as mentioned in last week's **ELECTRIC RAILWAY JOURNAL**, ordered four express or interurban cars from the Jewett Car Company, the specifications of which follow:

Number of cars ordered	.....2
Builder of car body	.....Jewett Car Co.
Type of car	.....Express—All steel
Weight:	
Trucks	.....15,500 lb.
Equipment	.....7000 lb.
Bolster centers, length	.....25 ft. 0 in.
Length over all	.....45 ft. 0 in.
Truck wheelbase	.....73 ft. 0 in.
Width over all	.....8 ft. 4 in.
Body	.....All steel
Interior trim	.....Plain
Roof, arch or monitor	.....Arch
Air brakes	.....Westinghouse A. M. M.
Axles	.....A. E. R. A.—E. A.
Bumpers	.....Steel
Center and side bearings	.....Plain
Conduits and junction boxes	.....Plain
Control	.....Westinghouse "HL"
Couplers	.....M. C. B.
Gears and pinions	.....Nuttall "BP"
Hand brakes	.....Peacock
Heater equipment	.....Consolidated Car Heating Co.
Headlights	.....General Electric Co.
Journal bearings	.....Plain
Journal boxes	.....44 x 8 in.
Lightning arresters	.....Westinghouse
Motors, type and number	.....Westinghouse 306-CV-4, inside hung
Paint, varnish or enamel	.....Stain
Sanders	.....De France
Slack adjuster	.....Automatic
Springs	.....Semi-elliptic
Trolley catchers or retrievers	.....Ideal No. 2
Trolley base	.....Nuttall
Trucks	.....Baldwin class 73-22-K
Wheels	.....Carnegie 34 in.

Sand Springs Railway, Tulsa, Okla., is building three new 60-ft. four-motor cars in its own shop.

South Bethlehem & Saucon Street Railway South Bethlehem, Pa., expects to purchase fenders, electric heaters, registers and two single cars.

Columbus (Ga.) Electric Company has been advised by the builders, with whom it recently placed an order for six new Birney cars, that they will be shipped, according to a local report, some time in November.

City of San Francisco, Cal., has awarded the General Electric Company, Schenectady, N. Y., a \$40,000 contract for furnishing electric locomotives for the Hetch Hetchy water property enterprise. This is the new source of water supply to San Francisco in the Yosemite Valley.

Richmond Light & Railroad Company, New Brighton, S. I., N. Y., through the United States Shipping Board Emergency Fleet Corporation, has ordered twenty new cars from the Cincinnati Car Company, for delivery along in October or November. It is reported that the specifications as to cars and equipment are a duplicate of the rolling stock purchased by the Public Service Railway, Newark, N. J., which appeared on page 1217 of the **ELECTRIC RAILWAY JOURNAL** of June 22.

Seattle (Wash.) Municipal Street Railway has ordered six safety or one-man cars from the American Car Company; Thomas F. Murphine, superintendent of public utilities, St. Louis, Mo., recommends that the city of Seattle purchase twenty-five cars for use on its new line. Twenty of the new cars are desired for operation over the city's proposed new elevated line, and the other five are for increased business of the present municipal lines. It is expected that the completion of the elevated will increase traffic over other

municipal lines. The cars which Mr. Murphine proposes to buy are second-hand to cost \$6,611 each, a bid given by the United Logging & Railway Supply Company. Twenty new double-truck cars have also been ordered for the system.

Wheeling (W. Va.) Traction Company in January, 1917, placed an order for fourteen double-truck passenger cars. There was a long delay in delivery. Four of the cars have now been received and the remaining ten are expected soon. These cars are 50-ft. body, seat fifty-two passengers and have Baldwin M.C.B. trucks. Williston Fish, senior vice-president, in furnishing this report to the ELECTRIC RAILWAY JOURNAL, under date of July 27, adds that on Feb. 4, 1918, the company lost twenty-nine double-truck passenger cars by a fire which burned one bay of its Wheeling Island carhouse, noted in the ELECTRIC RAILWAY JOURNAL of Feb. 9. The loss was complete. The company before the end of February made contracts for replacing the twenty-nine cars. Practically all the equipment has been delivered and the Cincinnati Car Company is about ready to begin delivery of the car bodies. These cars are also 50 ft. over all, 8 ft. 9 in. wide, seat fifty-two, with Hale & Kilburn seats and Brill trucks. The weight per car complete will be about 34,500 lb. At the same time that the order for twenty-nine cars was placed the Wheeling Traction Company also ordered nine double-truck passenger cars with which to inaugurate a new through line between Wheeling, W. Va., and Steuben-

ville, Ohio, a distance of about 26 miles. These cars are 56 ft. over all, center-entrance, and seat seventy persons, and are equipped with Brill trucks, Westinghouse motors and couplers. The company will shortly order one snow sweeper, in addition to the cars above mentioned.

Trade Notes

Economy Electric Device Company, Chicago, Ill., announces that the Sangamo Economy Railway watt-hour meters have been specified on the six safety cars and twenty double-truck cars which are about to be built for the Seattle (Wash.) Municipal Street Railway.

Consolidated Car Fender Company, Providence, R. I., through Wendell & MacDuffie is equipping the twenty new cars ordered by the Richmond Light & Railroad Company, New Brighton, S. I., N. Y., with its H-B life guards or fenders. The cars are being built by the Cincinnati Car Company.

Metal & Thermit Corporation, New York, N. Y., announces that the address of Anton Lucas, its representative in that part of the country, is now 2542 Troost Avenue, Kansas City, Mo. As Mr. Lucas spends considerable of his time traveling, however, it is recommended that communications be addressed directly to the company's offices in New York City, in cases that need prompt attention.

New Advertising Literature

W. N. Matthias & Brother, St. Louis, Mo.: Catalog-handbook No. 9, furnishes additional information about the firm's pole line accessories.

Armstrong Cork Company, Pittsburgh, Pa.: Illustrated, four page folder, in colors, descriptive of the company's Nonpareil insulating line.

Joseph Dixon Crucible Company, Jersey City, N. J.: Illustrated catalog descriptive of Dixon's standard graphite productions. New prices are furnished on application.

Steel City Electric Company, Pittsburgh, Pa.: Catalog No. 33, the first edition, cancels and supersedes all previous bulletins from No. 21 to 32. It illustrates, describes in detail and gives prices of the company's long list of products.

Sprague Electric Works of the General Electric Company, New York, N. Y.: Bulletin No. 48,938, superseding No. 902, entitled "Electric Grab-Bucket Hoists." Illustrations of the hoists, accompanied by detailed specifications of the various types, are given.

Green Engineering Company, East Chicago, Ind.: Sixteen-page booklet entitled "Capacity," describing and illustrating "Sealflex" arches, which are designed to increase the boiler rating. The booklet tells the story of the development of these arches and illustrates features of their construction.

NEW YORK METAL MARKET PRICES

	July 24	July 31
Copper, ingots, cents per lb.	26	26
Copper wire base, cents per lb.	29.25	29.25
Lead, cents per lb.	8.05	8.05
Nickel, cents per lb.	40	40
Spelter, cents per lb.	8.62½	8.23
Tin, Chinese*, cents per lb.	99	94
Aluminum, 98 to 99 per cent., cents per lb.	133.00	133.00

* No Straits offering. † Government price in 50-ton lots or more, f. o. b. plant.

OLD METAL PRICES—NEW YORK

	July 24	July 31
Heavy copper, cents per lb.	21½	23½
Light copper, cents per lb.	20	20½
Red brass, cents per lb.	22	22
Yellow brass, cents per lb.	14	14
Lead, heavy, cents per lb.	7	7
Zinc, cents per lb.	5½	5½
Steel car axles, Chicago, per net ton.	\$41.52	\$41.52
Old carwheels, Chicago, per gross ton.	\$29.00	\$29.00
Steel rails (scrap), Chicago, per gross ton.	\$34.00	\$34.00
Steel rails (relaying), Chicago, gross ton.	\$60.00	\$60.00
Machine shop turnings, Chicago, net ton.	\$16.23	\$16.23

ELECTRIC RAILWAY MATERIAL PRICES

	July 24	July 31
Rubber-covered wire base, New York, cents per lb.	30 to 37	30 to 37
Weatherproof wire (100 lb. lots), cents per lb., New York.	36.75	37.40
Weatherproof wire (100 lb. lots), cents per lb., Chicago.	37.50	37.50 to 37.72
T rails (A. S. C. E. standard), per gross ton.	\$70.00 to \$80.00	\$70.00 to \$80.00
T rails (A. S. C. E. standard), 100 to 500 ton lots, per gross ton.	\$67.50	\$67.50
T rails (A. S. C. E. standard), 500 ton lots, per gross ton.	\$62.50	\$62.50
T rail, high (Shanghai), cents per lb.	4½	4½
Rails, girder (grooved), cents per lb.	4½	4½
Wire nails, Pittsburgh, cents per lb.	3½	3½
Railroad spikes, drive, Pittsburgh base, cents per lb.	4½	4½
Railroad spikes, screw, Pittsburgh base, cents per lb.	8	8
Tie plates (flat type), cents per lb.	3½	3½
Tie plates (brass type), cents per lb.	3½	3½
Tie rods, Pittsburgh base, cents per lb.	7	7
Fish plates, cents per lb.	3½	3½
Angle plates, cents per lb.	3½	3½
Angle bars, cents per lb.	3½	3½
Rail bolts and nuts, Pittsburgh base, cents per lb.	4.90	4.90
Steel bars, Pittsburgh, cents per lb.	5	5
Sheet iron, black (24 gage), Pittsburgh, cents per lb.	4.90	4.90
Sheet iron, galvanized (24 gage), Pittsburgh, cents per lb.	5.80	5.80
Galvanized barbed wire, Pittsburgh, cents per lb.	4	4.35

	July 24	July 31
Galvanized wire, ordinary, Pittsburgh, cents per lb.	3.95	3.95
Car window glass (single strength), first three brackets, A quality, New York, discount.	80%	80%
Car window glass (single strength), first three brackets, B quality, New York, discount.	80%	80%
Car window glass (double strength, all sizes AA quality), New York discount.	82 & 3%	82 & 3%
Waste, wool (according to grade), cents per lb.	11½ to 27	11½ to 27
Waste, cotton (100 lb. bale), cents per lb.	13 to 13½	13 to 13½
Asphalt, hot (150 tons minimum), per ton delivered.	\$38.50	\$38.50
Asphalt, cold (150 tons minimum, pkgs. weighed lb., F. O. B. plant, Maurer, N. J.), per ton.	\$42.50	\$42.50
Asphalt filler, per ton.	\$45.00	\$45.00
Cement (railroad lots), New York, per bbl.	\$3.20	\$3.20
Cement (railroad lots), Chicago, per bbl.	\$3.34	\$3.34
Cement (railroad lots), Seattle, per bbl.	\$3.68	\$3.68
Lined oil (raw, 5 bbl. lots), New York, per gal.	\$1.82	\$1.86
Lined oil (boiled, 5 bbl. lots), New York, per gal.	\$1.83	\$1.88
White lead (100 lb. keg), New York, cents per lb.	10½	10½
Turpentine (bbl. lots), New York, cents per gal.	66	65

* Government price † These prices are f. o. b. works, with boxing charges extra.



Hundreds of Peacock Brakes in the Great Northwest

SEATTLE, Tacoma, Portland — the three great cities of the Northwestern Coast—all have grades that look like the ascent of young mountains.

And between them these three cities have hundreds of Peacock Brakes—and have had them for years.

Is it likely that roads like these would have selected and held on to the Peacock unless its reliability was beyond all question?

Their combined judgment as to the hand brake for their *real* grades is worth your attention.

The Peacock makes good on the hills and on the level.

National Brake Co.
Buffalo, N. Y.



The Eccentric
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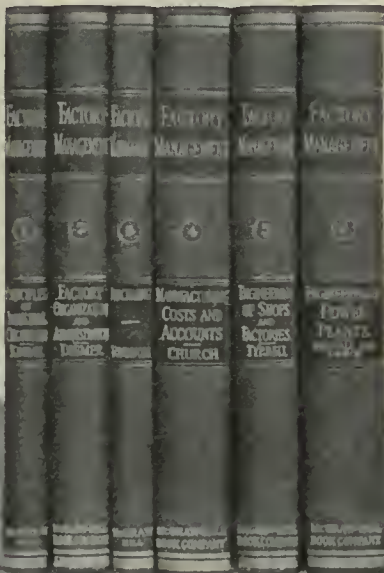
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Don't handicap yourself in the climb. Put every bit of effort you can into it. Get all the training you can to help you, for if there is one thing that everyday experience hammers home, it is this: The *trained* man is the man who wins out.

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The Bonham Traffic Recorder

"These recorders give us information which enables us to determine at a glance the distribution of travel; showing from and to what stations each passenger rides, enabling us to determine at what points on the lines is the maximum load; and the number of passengers handled to and from any station about which there may be a question.

"In one case we had to cut out stops on some limiteds to enable us to make the time. The record showed the station which had the least travel and exactly the amount of travel each day. This put us in a position to determine whether it would be policy to cut out the stop and also to answer the complaints of the people at that station after the stop was cut out. There is no guess work about the Bonham Traffic Recorder. The data are before you and you can get almost anything you want from it."

The Bonham Recorder Company
Hamilton, Ohio



This summer we will install Consolidated Heaters in our cars

Our Heating Troubles Last Year Were Expensive!

"Our old heaters caused excessive current consumption and in order to overcome the "knocks" our service suffered we decided to discard them.

"At first we thought this meant a big loss—to rip out old equipment—but that was before we figured on using Consolidated Heaters. *This* winter there'll be a different story about our service. We're going to turn every former knocker into a booster, and save enough current consumption to start paying off a big slice of the cost."

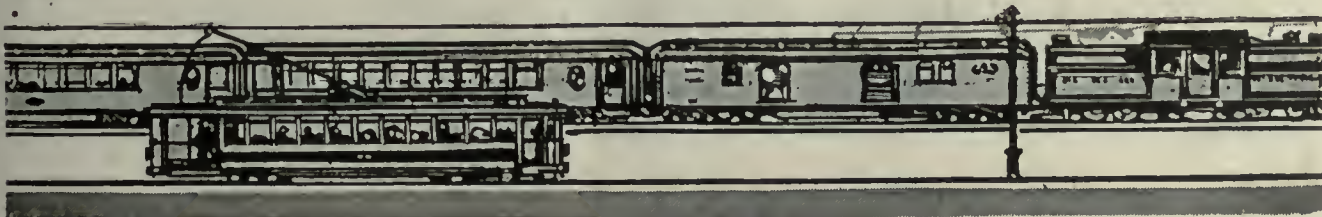
Why They Decided on Consolidated Heaters
Consolidated Car Heaters have ventilated porcelain

cores supporting the coils, allowing air to pass on all sides. This insures quick radiation and keeps the coils at low temperature. Coils are perfectly insulated, and supported continuously to eliminate vibration. Lead wires are at one end of cross-seat heaters, to simplify installation. Weight has been reduced by using steel cases.

There are many other distinctive features that have made Consolidated Heaters standard equipment for railway service. We will be glad to tell you about them.

Makers of the Famous Consolidated Thermostat.

CONSOLIDATED CAR-HEATING COMPANY
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Water- and Dust-Tight Condulets

V and VH Series with Key Socket Attachment



Type V—One of a Complete Series of Condulets Particularly Adapted for use in Textile and Flour Mills—Made in All Combinations and Sizes—Brass or Iron, as Specified

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Around the Continent With Hale and Kilburn

On the Norfolk and Western Electrification



The same progressive management that led the Norfolk and Western Railway to electrify its mountain grade service is visible in its passenger cars.

Particularly in the use of the most comfortable seating obtainable for long distance riding—the Hale and Kilburn plush-covered reversible seat with pressed steel pedestals, pressed steel end plates, curved arm-rests of wood and wooden foot-rest.

The back of this seat has three divisions—the lowest part curved to support the spine, the

middle part flat to support the shoulders and the top curved to form a comfortable base for the neck and head. Furthermore, the reversing mechanism is so arranged that the seat back as a whole is kept at the angle most comfortable for the passenger.

Therefore, when you visit this great electrification, don't fail to note that the Norfolk and Western has other practices worth emulation!

Hale and Kilburn Seating is standard for Every Service from City to Trunk Line.



Hale and Kilburn Corp.

Philadelphia
Washington

New York
Atlanta
Chicago

San Francisco
Louisville



THE OHMER SYSTEM



Under the Ohmer System, it is decidedly to the conductor's advantage to *collect* the fare, to collect the *right fare*, and to *register* the fare *correctly*. If for any reason the fare is not registered, the conductor is constrained to turn it in anyway, and you have *knowledge of the fact that it was not registered*.

The publicity which surrounds each transaction is such that irregularities on the part of both passenger and conductor are reduced to a minimum. If there *are* any irregularities, they are soon understood through the method of merit analysis made possible by the Ohmer System and the proper discipline can be applied.

The Ohmer System consists of the most successful ideas of modern business applied to the conservation of the receipts of electric railways.

OHMER FARE REGISTER COMPANY
DAYTON, OHIO



Protecting the honest conductor is part of the business of the Johnson Fare Box

When you employ a man or woman to handle your cash, your first duty is to make it easy for them to give an accounting that can't be misunderstood or disputed.

As each class of fare (cash—cash ticket) is recorded by the Johnson, it's double-checked by ringing up on the money side of a register within. Transfers are also rung up on the transfer side of the register.

It's no trouble for the conductor to make out a correct "Daily Fare Box and Register Report." It's no trouble for the inspector to see that fare box and register are working in harmony.

Johnson Fare Box Co.

Jackson Boulevard and Robey St., Chicago

50 East 42nd Street, New York





*Four Years' Service on Busy
Main Street, Los Angeles with*

International Coin Registers

One of the pioneer users of the International Coin Register is the Los Angeles Railway, which has had seventy-five in use on its Main Street center-entrance cars for some four years. Its experience has shown:

That the International Coin Register is especially adapted to a busy street like this where overlapping lines during the rush hour mean a car every 20 seconds.

Because the conductor is relieved of trying to

make box count and registration check under stress of rush-hour service. Every fare that goes through the box simply must be registered no matter what kind of memory coolness, skill or honesty the conductor may possess.

And the conductors say:

"We wish all cars in town had 'em so everybody would be wise to putting the money in the box. Life is a lot easier for us now and there are fewer kicks from the management."

The International Register Company
15 South Throop Street, Chicago, Ill.



Maintenance Money

If it were possible to get the figures it would certainly be interesting to know how much in maintenance costs have been saved to the electric railway industry by the use of

Agasote Products and Pantasote Curtains

It would surely total up to a very tidy sum.

The old style wooden roof with its covering of white lead and canvas had to be repaired at intervals to keep it waterproof.

In event of accident repairs were a tedious and costly process.

AGASOTE is absolutely waterproof to start with and it stays that way.

In event of accident it is *easily* and *rapidly* patched.

The old-fashioned lattice shutter used for car windows had to be kept painted or varnished. The slats got broken and had to be replaced.

The flimsy canvas curtain materials were easily torn, stained and discolored.

PANTASOTE CURTAINS have only to be washed to be as good as new.

No wonder that AGASOTE and PANTASOTE have become standard for the purposes for which they are used.

THE PANTASOTE CO.

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People's Gas Bldg., Chicago, Ill.

797 Monadnock Bldg., San Francisco, Cal.

BOYERIZED

Brake Pins and Bushings Stand Up Well In Washington



Washington cars were never worked harder than today because of the immense increase in traffic from war workers.

And now with the skip-stop coming in they are going to make 10 to 15 per cent. more mileage.

But whether the speed is low or high the load light or heavy the Boyerized pins and bushings in the brake rigging of these cars will keep them out on the road giving vital service instead of losing time, miles and money in the shop.

Don't overlook the little Boyerized Specialties that are of big consequence in safe, continuous operation and low maintenance.

ELECTRIC RAILWAY SUPPLIES
Bemis Car Truck Company
SPRINGFIELD MASS

THE MILLER TROLLEY SHOE

is in its Second Year of Successful Service
at Wilmington, N. C.



THE Tidewater Power Company, first tried the Miller Trolley Shoe early in 1917.

It got 18,000 miles from the contacts alone, and that record was quite sufficient in itself to prove the economy of the Miller Trolley Shoe.

But more than the advantage of long life, this railway got the added advantages that come from the use of a collector that clings to the wire at any speed and any curvature.

Thus avoiding the destruction of the overhead line, the loss of time in transportation and, not least important, the annoyance which the platform men feel when they have to reset a pole every time they strike a curve or a change in alinement.

Sound reasons like these must be just as

TROLLEY LINE CONNECTION

The beach is connected with Wilmington by the well-equipped, up-to-date trolley line of the Tide Water Power Company. During the Summer season high speed electric trains run between Wilmington and the beach every half hour from early morning until late at night. A convenient schedule is also operated between seasons. During the season these electric cars meet all important incoming trains at the Union Depot in Wilmington, and carry passengers bound for the beach through to their destination without change of cars.

applicable to your property as to that of the Tidewater Power Company and scores of other users.

Just order enough Miller shoes to equip your *hardest* line!

Miller Trolley Shoe Co., West Newton, Mass.

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The exacting demands of war-time are bringing out the strong and weak points in every industry.

More-Jones products, whatever they may be, are made right. That is why they are generally recognized as the best being produced today.

For instance, the V-K oilless trolley wheel is made of new metal exclusively, extremely tough and long wearing, and in combination with the V-K Non-Arcing Harp, results in practical economies impossible with any other type.

Into More-Jones "Tiger" bronze axle and armature bearings are put the best selected material *plus* expert foundry practice, developed in over forty years' experience. Laboratory control and careful inspection insures the furnishing of perfect bearing structures.

Then think of More-Jones armature babbitt metal, the standard on American electric railways. Made of pure new metal perfectly amalgamated and of uniform composition. It is strong, tough, pliable and of the lightest obtainable bulk. Can be remelted and used over and over again.

The only way to overcome higher costs is by using equipment of higher efficiency.

More-Jones Brass & Metal Co.
St. Louis, Mo., U. S. A.



V-K

More-Jones "Tiger" Bronze Axle Bearings



Armature Babbitt Metal



Standard for 67 Years

The Chilled Iron Wheel has performed its every function at a minimum cost.

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95% of all cars in this type of service are carried on Chilled Iron Wheels.

For Street Cars

The Chilled Iron Wheel is Standard for Street Car Service in 95 out of 100 cities in the United States and Canada, operating 100 cars or over.

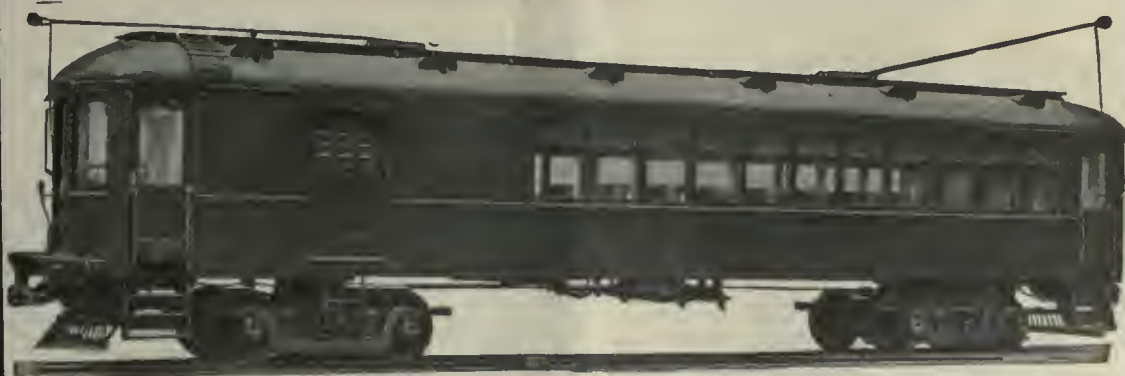
The Conclusion

to be gained from these figures is that the Chilled Iron Wheel gives the Greatest Service for the Lowest Cost.

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Representing Forty-eight Wheel Foundries Throughout the United States and Canada. Capacity 20,000 Chilled Iron Wheels per Day.

The
Wonderful
Single-Service
Chilled-Iron
Wheel





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Line equipment is made of our own metal alloys. No scrap is used for melting purposes. Correct design and careful manufacture are the things we take pride in.

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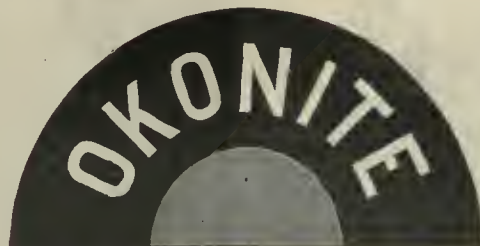
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You Can Minimize Overhead Repair Work

and successfully cut maintenance costs if you turn to

The Macallen Line

of strain insulators, hangers, splicing ears, crossings, and other overhead material.

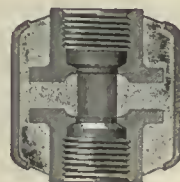
They are "specialty" products, designed and built to make "Macallen" the standard on American railways.

It will pay you to write for information and prices.

The Macallen Insulating Joint

Adopted by principal air brake manufacturers as part of their standard equipment. Also insulates steam pipes, etc. Shell is seamless drawn steel, nipples are machined from steel rod, and insulating material is Macallen Vulcanite Compound, not affected by heat or oil—practically indestructible.

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The Macallen Company
Macallen and Foundry Sts., Boston



Anderson Equipment Reduces Overhead Repairs



Anderson Section Insulator



Anderson Cross-Over

Correctly designed and proportioned to eliminate flaring arcs and wheel trouble. This cross-over is saving upkeep expense for many prominent railway companies.

Many roads have made Anderson products their standard equipment because they have found that the resultant saving in overhead repairs far outweighs the initial cost of the Anderson specialties.

All Anderson products are mechanically correct in design. They are made to give satisfactory service under all kinds of operating conditions. Send for the catalogs.

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(Established 1877)

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No Matter How Hard
You Grip**



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Rubber Insulated
Pliers

Will not Leak—Cannot Crack

It is a well-known fact that rubber is the best insulator. We realized this long ago and were the first to put on the market a tested insulated plier with an unbreakable insulation.

Being the pioneers, we naturally have striven to remain foremost in the field. As a proof of our success, we need

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The Rubber Insulated Metal Corp., Plainfield, New Jersey

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IRON, STEEL AND
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Galvanized E. B. B. and B. B. Telephone and Hard Drawn Copper for Telephone
Lines. Bronze and Galvanized Steel Contact Wire. Galvanized
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There is no reason for using dynamite of 40% or 60% strength when the same or better results can be accomplished with a grade of less strength.

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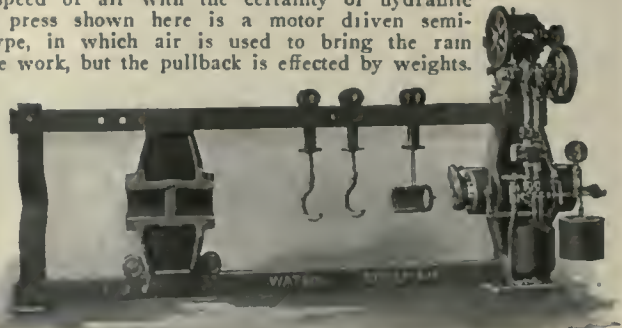
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Motor Driven 300 Ton Hydro-Pneumatic Wheel Press

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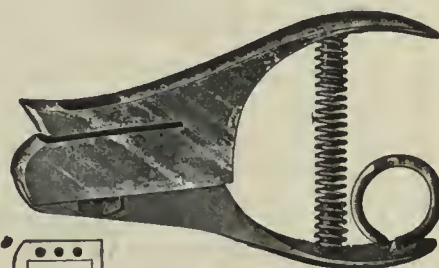
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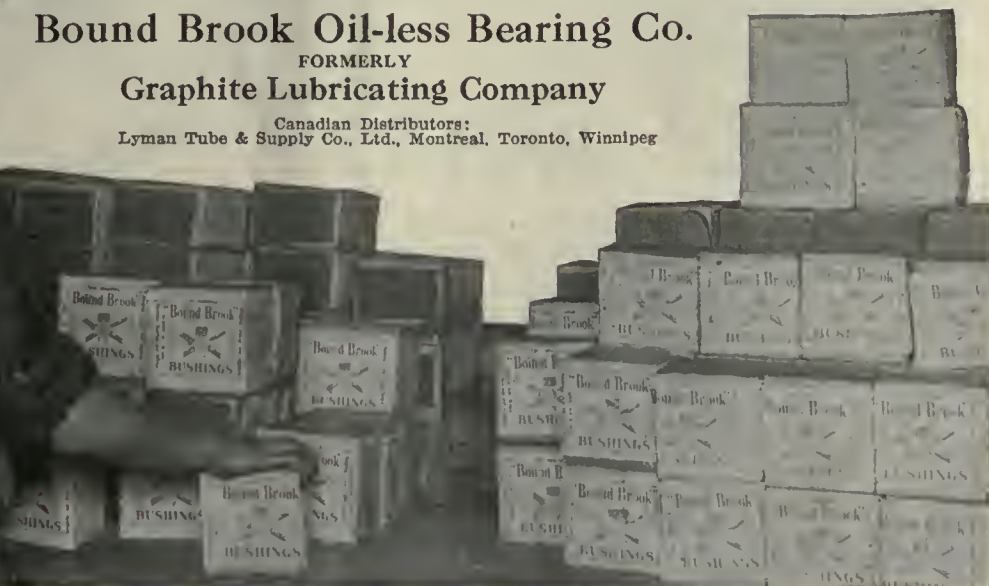
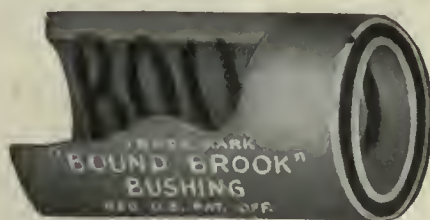
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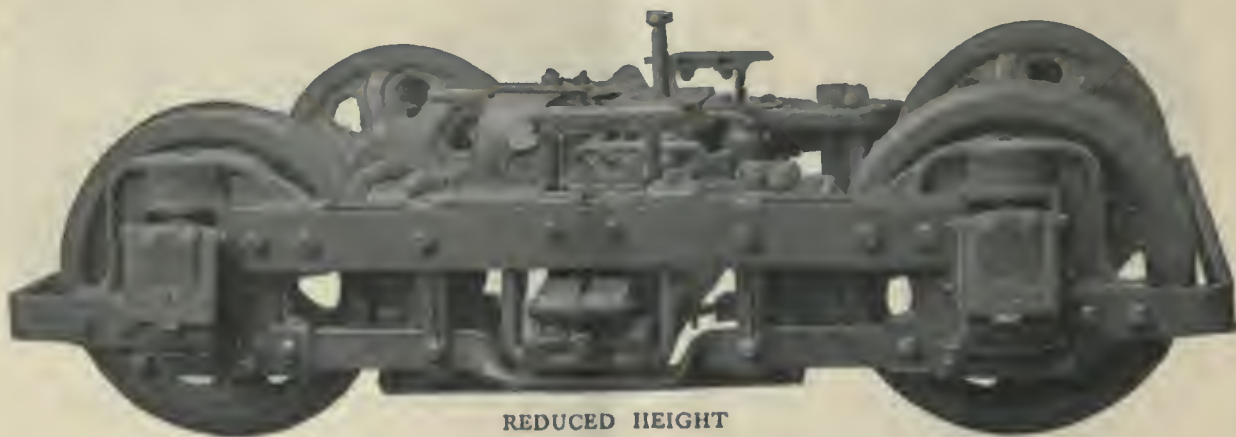
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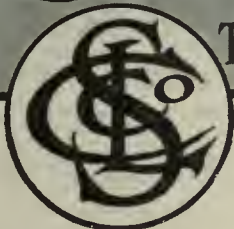
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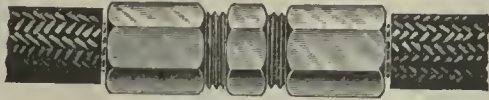
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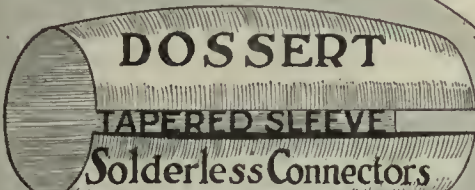
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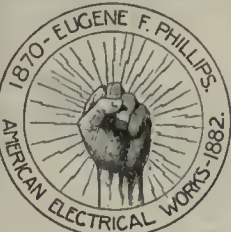
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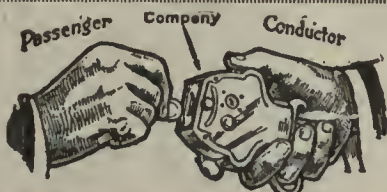
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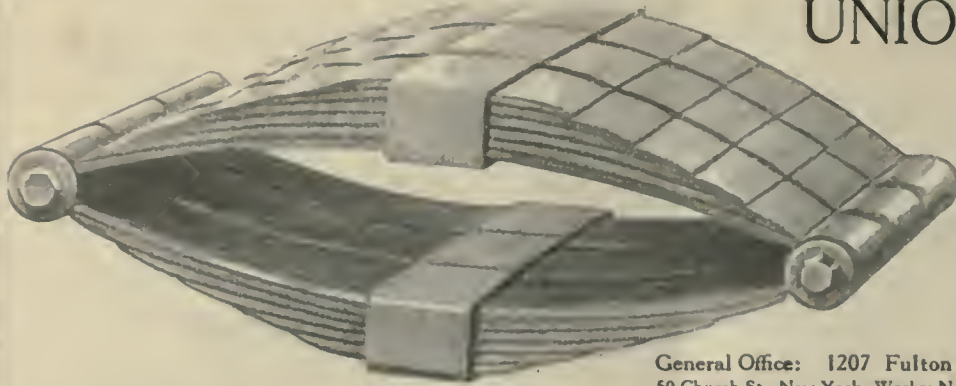
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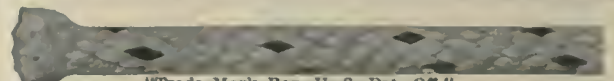
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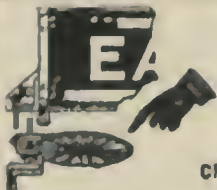
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TRUSTEES' SALE— STREET RAILWAY PROPERTY

Notice is hereby given that under and by virtue of that certain deed of sale, made and entered on the 26th day of June, 1915, by the Honorable Rhydon M. Call of the United States District Court for the Southern District of Florida, in Chancery, in that suit therein pending whereof Charles M. Allen is complainant and

ST. PETERSBURG & GULF RAILWAY COMPANY

a corporation is defendant, and the undersigned as Trustees under that certain Deed of Trust executed by the said Railway Company on the first day of August, 1915, as intervenors, the undersigned as such Trustees will sell, at the main office of St. Petersburg & Gulf Railway Company, in the City of St. Petersburg, Florida, on

MONDAY, AUGUST 5th, A.D., 1918

the same being legal sales day, between the hours of 11 a. m. and 3 p. m., to the highest and best bidder the property covered by said Deed of Trust and described in said Decree of Sale, to wit:—

The following Rolling Stock, consisting of seventeen passenger cars, three work cars, one freight car, seven truck flat cars

Also the following Track and Overhead, together with all wires, poles and fixtures, road bed, tie rails, franchises, rights of way, or otherwise, used in connection with said track and overhead equipment, as the same is now located over and upon and along the streets and portions of the City of St. Petersburg, Florida, and vicinity, the streets of Gulfport, Florida, and vicinity and County Roads of Pinellas County, Florida, consisting of 26.56 more or less, miles of track composed of Davis and Jungle Line commencing at the intersection of Beach Drive and Central Avenue and extending Westward on Central Avenue to Park Street North and thence north-westward on Park Street North to road leading to Jungle Dock, and thence Westward on said road leading to Jungle Dock to and over said Jungle Dock to the western end thereof; also Gulfport Line commencing at the intersection of Ninth Street South and Central Avenue thence extending Southward on Ninth Street South to Tangerine Avenue, thence Westward on Tangerine Avenue to Davis Boulevard, thence Southward on Davis Boulevard to and over the Gulfport Dock to the southern end thereof; also Big Bayou Line (being composed of lines owned and under two leases, one from Rayboro Investment to St. Petersburg Investment Company, and the other from Roy B. Hanna Trustee to St. Petersburg & Gulf Railway Company), the line constructed under the first lease commencing at the intersection of Fifth Street South and Central Avenue, thence extending Southward on Fifth Street South to 6th Avenue South, thence eastward on 6th Avenue South to Third Street South, thence Southward on Third Street South to Fifteenth Avenue South, and thence Eastward on Fifteenth Avenue South to shore of Tampa Bay, and thence along the line constructed under the lease from Hanna commencing at a point on the last above described course about five hundred feet Westward from the terminus on the shore of Tampa Bay, and thence extending Southward, South Westward and again Southward on an irregular course to a point on the westerly shore of Big Bayou; also Hemlin and North Ninth Street Line composed partly of the original trackage and partly of trackage under two leases one from C. A. Applekate, Trustee, to St. Petersburg & Gulf Railway Company, and the other from C. Perry Snell and J. C. Hamlett to St. Petersburg & Gulf Railway Company, the trackage originally constructed commencing at the intersection of Second Street North and Central Avenue, thence Northward on Second Street North to 6th Avenue North, thence Eastward on 6th Avenue North to 7th Avenue North to Ninth Street North, thence Northward

Ninth Street North to a point at or near the intersection of Tenth Street North and Ninth Street North, continuing from the last named intersection and built and operated under the Applekate lease, the line runs Northward on Ninth Street North to the intersection of Johna Pass Road and continuing northward from this point the line was built and is operated under the lease from Snell and Hamlett and extends Northward on Ninth Street North to 34th Avenue North, and thence Eastward on 34th Avenue North to the Hemlin, being at or near the intersection of Hay Street; also Coffee Pot Line commencing at the intersection of Seventeenth Avenue North and Second Street North and extending Eastward on Seventh Avenue North to Oak Street, thence Northward on Oak Street to Ninth Avenue North, thence Eastward on Ninth Avenue North to Loquist Street, and thence Northward on Loquist Street to Ball Park, also Recreation Pier Line commencing at the intersection of Second Street North and Central Avenue North and extending Eastward on Second Avenue North to and over the municipal pier to the east end thereof; also Beach Drive Line beginning at the intersection of Central Avenue and Beach Drive and extending Northward along Beach Drive to the intersection of Second Avenue North also Electric Dock Line commencing at the intersection of Beach Drive and westerly boundary line of Water lot No. 4 according to revised map of the City of St. Petersburg, and thence extending eastward over water lot No. 4 and the electric pier there constructed thereon to the easterly end of said dock; also Fifteenth and Central Avenue Line com-

mening at the intersection of Central Avenue and Sixteenth Street, and thence extending Northward on Sixteenth Street to car barn and lighting plant.

Also the following real estate in Pinellas County, Florida, to wit: The north one hundred and fifty feet of water lot number four (4) according to revised map or plat of the City of St. Petersburg, as the same is recorded in the office of the Clerk of the Circuit Court of Hillsborough County, together with the riparian properties and rights adjacent and connected with said lot on Tampa Bay, together with warehouse and waiting room:

Also Water Lot No. 1, being a part of or an addition to the revised map of Golf Course and Jungle Subdivision filed for record on December 1, 1916, in plat Book No. 4, page 48, public records of Pinellas County, Florida, upon which is constructed what is known as Jungle Dock.

Also water lot number five (5) of Boca Ceiga Park Subdivision, being the west two-thirds of government lot number two (2) and lands adjacent, all in Section 33, Township 31 South, Range 16 East, in the town of Gulfport, Florida, known as Gulfport Dock (the said Railway Company not yet having acquired complete title to said Gulfport Dock and being in possession thereof under contract), together with casino building at Gulfport, Florida.

All that certain tract of land beginning at a point 660.4 feet south and 30 feet east from the Northwest corner of the Southwest quarter of the northeast quarter of Section 24, Township 31 South, Range 16 East and run east 150 feet to a point; thence turn 89 degrees 37 minutes to the left and run 87.9 feet to a point; thence turn 88 degrees 33 minutes to the left and run 59.75 feet to a point; thence turn 55 degrees 10 minutes to the right and along the inside edge of a concrete retaining wall 46.82 feet to a point; thence turn 1 degree 8 minutes to the left and run along the inside edge of said wall 72.7 feet to a point; thence turn 24 degrees 8 minutes to the left and run along the inside edge of said wall 27.4 feet to the intersection of the east line of Sixteenth Street, thence turn 121 degrees 39 minutes to the left and run South along the east line of Sixteenth Street 203.5 feet to point of beginning; known as car barn property, together with the car barn and cement pier.

Also all line department, track, department tools all car barn materials and equipment, all tools on hand at car barn; also fourteen armature cores; also one pair New Bedford Scales and two trucks; also one Hummobile and one Vanders automobile; one lot of office furniture and fixtures, one electric driven Burroughs Adding Machine; all of the above-said personal property being more particularly and in detail described in the Receiver's inventory thereof now on file with the Deputy Clerk of the said Court at Tampa, Florida, and on file with Charles M. Allen, Receiver, at St. Petersburg, Florida, to which inventory reference may be had by intending purchasers.

Together with all licenses, patents, patent rights, processes heretofore owned by said St. Petersburg & Gulf Railway Company on May 3, 1918, at the time the Receiver of said property was appointed, and also all corporate, municipal and other franchises, rights, easements and immunities which the said Railway Company or Charles M. Allen, its Trustee, enjoyed on the 3rd day of May 1918, in connection with the above-said property. Also all property real and personal, of every nature and kind whatsoever which the said St. Petersburg & Gulf Railway Company owned at the date of the said Deed of Trust, to wit, August 1, 1915, or which it has since acquired, together with all and singular the appurtenances thereto belonging or in any wise appertaining; also the reversion and remainders, and also all the estate, right, title, interest, property, claim and demand whatsoever, as well as law as in equity, of, in and to any part of the above-said property.

That said property is being sold by authority of said Trust Deed and of said Decree to satisfy taxes and other governmental liens outstanding against said property, such Receiver's certificates as may have been authorized by said Court, costs and expenses of sale, including a reasonable attorney's fee for the undersigned, and to satisfy \$250,000.00 in bonds outstanding under said Deed of Trust.

That the successful bidder at said sale will be required to deposit with the undersigned the sum of \$15,000.00 in the form of certified check, or otherwise, as indemnity against his said bid, in the event that the same should be confirmed by the Court and not made good after such confirmation; that upon such sale being made the undersigned will duly report the same to the Court and upon such sale being confirmed by said Court, the undersigned as Trustee, will execute good and sufficient deed or deeds to the purchaser or purchasers of the said property.

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Bonner Springs, Kansas

BOILERS WANTED

One or two new or second-hand water tube boilers, 300 to 500 hp. each, for 180 lb. working pressure. Prefer Heine but will consider any good boiler. State age, present condition, height now set above floor line, price and how soon could be shipped. If stokers and stacks offered describe and quote separately. Address

FEDERAL, c/o Rudolph Guenther, Inc.
25 Broad St., New York

WANTED

Motor Generator Set

25 to 60-cycle, or frequency changer, 25 to 60-cycle, 3-phase, 2300 V. on each side. Capacity 300, 500, or even 750 K.W. *Shipment wanted at once.*

ALBANY SOUTHERN RAILROAD CO.
Rensselaer, N. Y.



Armature Coil Taping Machine

Save Time,
Labor and Money

A boy can tape 40 coils for Westinghouse 12A Armature in an hour. Further particulars gladly furnished.

Geo. M. Griswold Machine Co.
New Haven, Conn.

SEARCHLIGHT SECTION

GET YOUR WANTS INTO THE "SEARCHLIGHT"

ADVERTISING RATES

Ads Set in Uniform Style

(Solid, in one paragraph, without display.)

THREE CENTS A WORD, minimum charge 50 cents an insertion, payable in advance, less 10 per cent. If one payment is made in advance for four continuous insertions—for advertisements under:

Positions Wanted	Vacation Work Wanted
Evening Work	Tutoring
Wanted	Salesman Wants Connections

FIVE CENTS A WORD, minimum charge \$1.50 an insertion, for advertisement under:

Agencies Wanted	Positions Vacant
Agents Wanted	Partner Wanted
Business Opportunities	Representations Wanted
Desk Room for Rent	Salesmen Wanted
Educational	Patents for Sale
Employment Agencies	Plans for Sale
Desk Room Wanted	Sub-Contracts Wanted
Foreign Business	Work Wanted

Miscellaneous for Sale, for Rent or Want Ads.

THIRTY CENTS A LINE, minimum five lines, for all undisplayed advertisements set with a paragraph for each item or tabulated.

THREE DOLLARS AND SIXTY CENTS AN INCH for advertisements for bids (Official Proposals).

Ads Set in Display Type

(Individual space, within border rules.)

Space for these advertisements is sold by the inch. Each page contains 27 inches. The rate per inch is based on the total number of inches to be used—that is, the number of inches the advertisement is to occupy multiplied by the number of insertions it is to receive. For instance, a 2-inch advertisement in 2 issues earns the 4-inch rate of \$3.90 an inch. A 1-inch space in 4 issues, or a 4-inch space in one issue, also earn the 4-inch rate.

SCHEDULE OF RATES

1 to 3 in., \$3.00 an in.	15 to 26 in., \$2.70 an in.
4 to 7 in., 2.90 an in.	27 to 49 in., 2.60 an in.
8 to 14 in., 2.80 an in.	50 to 99 in., 2.50 an in.

Rates for larger space furnished on request.

*For quick and satisfactory results
tell the reader everything that
he wants to know*

INFORMATION

ALLOW FIVE WORDS for the address, if replies are to a box number in care of any of our offices. There is no extra charge for forwarding replies.

IN REPLYING TO ADS, do not enclose original testimonials or anything that you may want returned. State your experience and qualifications in as concise and neat a manner as possible and enclose copies of your testimonials.

BE CAREFUL TO PUT ON ENVELOPE, when answering any "blind," ad, the box number in the ad, the name of the paper, and also the local address of office to which reply is sent:

36th St., at 10th Ave.,	New York
1570 Old Colony Bldg.,	Chicago
657 Leader-News Bldg.,	Cleveland
935 Real Estate Trust Bldg.,	Philadelphia
1011 Newhouse Bldg.,	Salt Lake City
501 Rialto Bldg.,	San Francisco

WHEN ADVERTISING MACHINERY, use your own name and address—or a local address of some kind—so that the readers can wire direct and get quick replies. We advise also that you state in your advertisement the present location of plant that is offered for sale, or point of delivery provided you are in the market for equipment.

TO SIGN YOUR NAME and address to your advertisement begets the confidence of the reader and facilitates receiving replies. You can, however, obviate delay in receiving answers by aligning your ad, only with initials (your own or others), care of your home, your office or a post-office box number in your city.

WANTED

ROTARY CONVERTER

One Thousand (1000) kw., 6-phase, 60-cycle, 600-volt.

Also Three (3) 400-kva.

TRANSFORMERS

1-phase, 60-cycle, primary voltage 13,000.

William T. Twomey, 111 W. Monroe St., Chicago

POSITIONS VACANT

ARMATURE winder wanted immediately. P-224, Elec. Ry Journal, Chicago.

CAR barn foreman wanted at once. P-225, Elec. Ry. Journal, Chicago.

CHIEF Clerk to Auditor wanted. Must be familiar with Interstate Classifications, and a live wire capable of taking entire charge of Auditing Department, City and Interurban property. State age, salary required, education and experience. P-222, Elec. Ry. Journal, Chicago.

DRAFTSMAN, experienced on electrical power plant or sub-station work. Good future for men of ability. New York & Queens Electric Light & Power Co., 444 Jackson Ave., Long Island City, New York.

GRADUATE electrical engineer wanted. Competent to design, construct and operate transmission lines up to 66,000 volts, general power and railway distribution including bonding, electrolysis and electric signals. Also to act in a consulting capacity in reference to all electrical matters pertaining to power houses, substations, car equipments and all other electrical matters in connection with a large electric railway and power system. Address, giving nationality, age, experience, salary wanted and references, General Manager, The Shore Line Electric Railway Company, 362 Main St., Norwich, Conn.

Keep your eye on the
Searchlight and your
advertisements in it.

POSITIONS VACANT

MEN with technical training or experience wanted for testing and efficiency work in power plants and substations of large electric railway system; good pay for men of adequate qualifications in the field of electric or steam plant equipment; state status with respect to draft. P-208, Elec. Ry. Journal.

STATION wiremen and helpers wanted for central and sub-station construction by large eastern power company. Permanent position and good wages. State experience and draft classification. P-215, Elec. Ry. Journal.

STOREKEEPERS wanted also clerk in managers office. Mobile Light and R.R. Co.

TRAVELLING Auditor wanted to check Freight and Ticket Agents' Accounts. State experience, age and salary expected, and give references. P-221, Elec. Ry. Journal, Chicago.

TWO experienced railway sub-station operators wanted. State experience and wages expected P-219, Elec. Ry. Journal, Philadelphia.

WORKING master mechanic wanted for medium sized road. State experience and salary. P-220, Elec. Ry. Journal, Philadelphia, Pa.

POSITIONS WANTED

CLAIM agent, regarded as one of the oldest and most successful, one of the leading experts in accident prevention and high class transportation man, desires change. Particularly desirous of becoming attached to a property in which the accident expense is regarded as unreasonably high. Would undertake to bring about substantial reduction and can do so within a reasonably short time. Highest references. PW-217, Elec. Ry. Journal.

MASTER mechanic desires position on medium sized road; can put run down equipment in high grade operating condition. PW-202, Elec. Ry. Journal, Cleveland.

POSITIONS WANTED

EXECUTIVE will be open for position Sept. 1; 12 years' executive and operating experience in all departments of city and interurban electric railways; full particulars upon request. PW-213, Elec. Ry. Journal, Chicago.

MASTER mechanic now employed wants to make a change. Can put down equipment in high grade operating condition. PW-216, Elec. Ry. Journal.

YOUNG married man, expert on railway motor and controller repairs, desires position offering chance for advancement; state salary; can report in 40 days. PW-214, Elec. Ry. Journal.

AUDITOR solicits change; thirteen years' experience in Street Railway Accounting; age 35; married; references. PW-223, Elec. Ry. Journal.

SUPERINTENDENT OF CONSTRUCTION

seeks opportunity to make change for satisfactory reasons. Thoroughly experienced in track, power house and ear barn construction, etc. Reference.

PW 203—Elec. Ry. Journal, Leader-News Bldg., Cleveland, O.

OPERATING EXECUTIVE

with 6 years as Superintendent and 7 years as Manager of street and interurban railway, open for engagement. Thoroughly conversant with modern practice and have wide knowledge of working methods and economies necessary to meet present rapid changing conditions. Electrical and mechanical engineer. Wide experience in technical and non-technical subjects. Energetic, Married, Methodical. A good man to meet the public. Now employed but desirous of assuming greater responsibility. Best of references.

PW218—Electrical Railway Journal 1570 Old Colony Bldg., Chicago, Ill.

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with
Names of Manufacturers and Distributors Advertising in this Issue

Acetylene Service & Apparatus
Oxweld Acetylene Co.

Advertising, Street Car.
Collier, Inc., Barron G.

Air Recifiers.
Holden & White, Inc.

Anehora, Guy.
Electric Service Supplies Co.
Holden & White, Inc.
Ohio Brass Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

Anti-Climbers.
Railway Improv. Co.

Armatures, Shafts
Laclede Steel Co.

Automobiles and Buses.
Brill Co., The J. G.

Axle Straighteners.
Columbia M. W. & M. I. Co.

Axles.
Bemis Car Truck Co.
Brill Co., The J. G.
Carnegie Steel Co.
Laclede Steel Co.
National Railway Appliance Co.
St. Louis Car Co.
Standard Steel Works Co.
Taylor Electric Truck Co.
Westinghouse Elec. & M. Co.

Abbitting Devices.
Columbia M. W. & M. I. Co.

Badges and Buttons.
American Railway Supply Co.
Electric Service Supplies Co.
International Register Co., The.
Woodman Mfg. & Supply Co., B.

Bankers and Brokers.
Coal & Iron National Bank.

Batteries, Dry.
Johns-Manville Co., H. W.
Nichols-Lintern Co.

Batteries, Storage.
Electric Storage Battery Co.

Bearings and Bearing Metals.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
More-Jones Brass & M. Co.
St. Louis Car Co.
Taylor Elec. Truck Co.
Westinghouse Elec. & M. Co.

Bearings, Center and Roller Slide.
Holden & White, Inc.

Bearings, Oil-less, Graphite, Bronze and Wood.
Bound Brook Oil-less Bearing Co.

Bearings, Roller and Rail.
Gurney Ball Bearing Co.
Railway Roller Bearing Co.
S K F Ball Bearing Co.

Bells and Gongs.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
St. Louis Car Co.

Benders, Rail.
Niles-Bement-Pond Co.
Watson-Sullivan Co.
Zelnicker Supply Company, Inc.,
Walter A.

Blasting Powder and Equipment.
Du Pont de Nemours Co., E. I.

Roller Cleaning Compounds.
Johns-Manville Co., H. W.

Roller Coverings.
Johns-Manville Co., H. W.

Roller Tubes.
National Tube Co.

Rollers.
Babcock & Wilcox Co.

Road Testers.
American Steel & Wire Co.

Ronding Apparatus.
Electric Railway Improv. Co.
Imperial Brass Mfg. Co.
Lincoln Bonding Co.
Ohio Brass Co.
Oxweld Acetylene Co.

Ronding Tools.
American Steel & Wire Co.
Electric Railway Improv. Co.
Electric Service Supplies Co.
Ohio Brass Co.

Bonds, Rail.
American Steel & Wire Co.
Electric Railway Improv. Co.
Electric Service Supplies Co.
General Electric Co.
Johns-Manville Co., H. W.
Lincoln Bonding Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

Book Publishers
McGraw-Hill Book Co.

Boring Tools, Car Wheel.
Niles-Bement-Pond Co.

Brackets and Cross Arms. (See also Poles, Ties, Posts, Pillars and Lumber.)
Creaghead Engrs. Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
Hubbard & Co.
Linsley Bros. Co.
Ohio Brass Co.

Brake Adjusters.
Holden & White, Inc.
Westinghouse Trac. Brake Co.

Brake Shoes.
American Brake S. & Fdy. Co.
Barbour-Stockwell Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
St. Louis Car Co.
Taylor Elec. Truck Co.
Wheel Truing Brakeshoe Co.

Brakes, Brake Systems and Brake Parts.

Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
General Electric Co.
Holden & White, Inc.
National Brake Co.
St. Louis Car Co.
Safety Car Devices Co.
Taylor Elec. Truck Co.
Westinghouse Trac. Brake Co.

Brooms, Track, Steel or Rattan.
Paxson Co., The
Zelnicker Supply Company, Inc.,
Walter A.

Brushes, Carbon.
General Electric Co.
Jeandron, W. J.
Morgan Crucible Co.
United States Graphite Co.
Westinghouse Elec. & M. Co.

Brushes, Graphite.
United States Graphite Co.

Brush Holders.
Anderson Mfg. Co., A. & J. M.
Eureka Co.

Bushings, Case Hardened Mangane.
Bemis Car Truck Co.

Bushings, Graphite and Wooden.
Bound Brook Oil-less Bearing Co.

Cables. (See Wires and Cables.)

Car Equipment. (For Fenders, Heaters, Registers, Wheels, etc., see those Headings.)

Car Trimmings. (For Curtains, Doors, Seats, etc., see those Headings.)

Cars, Passenger, Freight, Express, etc.

American Car Co.
Brill Co., The J. G.
Kuhlman Car Co., G. C.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.
Watson Mfg. Co.

Cars, Second Hand.
Electric Equipment Co.

Cars, Self-Propelled.
Electric Storage Battery Co.
General Electric Co.

Castings, Brass, Composition or Copper.
Anderson M. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eureka Co.
More-Jones Brass & M. Co.

Castings, Gray Iron and Steel.
American B. S. & Fdry. Co.
American Steel & Foundries
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
St. Louis Car Co.
Standard Steel Works Co.
Union Spring & Mfg. Co.

Castings, Malleable and Brass.
American Brake S. & Fdry. Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

Catchers and Retrievers, Trolley.
Electric Service Supplies Co.
Holden & White, Inc.
Ohio Brass Co.
Trolley Supply Co.
Wood Co., C. N.

Celllog, Car
Pantascote Co.

Cheeks, Employees.
American Railway Supply Co.

Circuit Breakers.
General Electric Co.
Westinghouse Elec. & M. Co.

Clamps and Connectors, for Wires and Cables.
Anderson Mfg. Co., A. & J. M.
Dowser & Co.
Electric Service Supplies Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

Cleaners & Scrapers, Track. (See also Snow-Plows, Sweepers and Steamers.)
Brill Co., The J. G.
Ohio Brass Co.

Clusters & Sockets.
General Electric Co.

Coal and Ash Handling. (See Conveying and Hoisting Machinery.)

Coasting Recorders.
Railway Improv. Co.

Coil Handling and Winding Machines.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

Colls, Armature and Field.
Cleveland Armature Works.
Columbia M. W. & M. I. Co.
D & W Fuse Co.
General Electric Co.
Independent Lamp & Wire Co.
King-Coil Mfg. Co.
Westinghouse Elec. & Mfg. Co.

Colls, Choke & Kicking.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Coin-Counting Machines.
Electric Service Supplies Co.
International Register Co.
Johnson Fare Box Co.

Commutator Slotters.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.
Wood Co., C. N.

Commutator Slotting Files.
Handy Supply Co.

Commutator Stones.
Handy Supply Co.

Commutator Truing Devices.
General Electric Co.

Commutators or Parts.
Cameron Elec'l Mfg. Co.
Cleveland Armature Works.
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
King-Coil Mfg. Co.
Mica Insulator Co.
Westinghouse Elec. & M. Co.

Compressors, Air.
General Electric Co.
Westinghouse Traction Brake Co.

Concrete Mixers
Jacger Machine Co.

Condensers.
Allie-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Couduits, Underground.
Johns-Manville Co., H. W.
Standard Underground Cable Co.

Connectors, Solderless.
Dowser & Co.
Westinghouse Elec. & Mfg. Co.

Controller Regulators.
Electric Service Supplies Co.

Controllers or Parts.
Columbia M. W. & M. I. Co.
General Electric Co.
Johns-Manville Co., H. W.
Westinghouse Elec. & M. Co.

Controlling Systems.
General Electric Co.
Westinghouse Elec. & M. Co.

Converters, Rotary.
General Electric Co.
Westinghouse Elec. & M. Co.

Conveying and Hoisting Machinery.
Columbia M. W. & M. I. Co.
Green Eng'g Co.

Cord, Bell, Trolley, Register, Etc.
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The.
Roebbling's Sons Co., John A.
Samson Cordage Works.
Trolley Supply Co.

Cord Connectors and Couplers.
Electric Service Supplies Co.
Samson Cordage Works.
Wood Co., C. N.

Couplers, Car.
Brill Co., The J. G.
Ohio Brass Co.
Van Dorn Coupler Co.
Westinghouse Trac. Brake Co.

Cranes. (See also Hoists.)
Niles-Bement-Pond Co.

Crestrolling. (See Wood Preservatives.)

Cross Arms. (See Brackets.)

Crossing Foundations.
International Steel Tie Co.

Crossing Signals. (See Signals, Crossing.)

Crossings, Track. (See Track, Special Work.)

Culverts.
American Rolling Mill Co.
Bark River B. & Culvert Co.
California Cor. Culvert Co.
Canada Ingot Iron Co., Ltd.
Canton Culvert & Sile Co.
Coast Culvert & Flume Co.
Corrugated Culvert Co.
Delaware Metal Culvert Co.
Dixie Culvert & Metal Co.
Hardisty Mfg. Co., R.
Illinois Corrugated Metal Co.
Independence Cor. Cul. Co.
Iowa Pure Iron Culvert Co.
Kentucky Culvert Mfg. Co.
Lone Star Culvert Co.
Lyle Corrugated Culvert Co.
Michigan Bridge & Pipe Co.
Montana Culvert Co.
Nebraska Culvert & Mfg. Co.
Nevada Metal Mfg. Co.
New England Metal Cul. Co.
North East Metal Co.
Northwestern Sheet & I. Wks.
O'Neill Co., W. Q.
Ohio Corrugated Culvert Co.
Pennsylvania Metal Cul. Co.
Road Supply & Metal Co.
Sioux Falls Metal Cul. Co.
Spokane Cul. & Tank Co.
Tennessee Metal Culvert Co.
United States Bridge & Pipe Co.
Utah Cor. Cul. & Flume Co.
Virginia Metal Mfg. Co.
Western Metal Mfg. Co.
Wyatt Metal & Boiler Works.

Curtains and Curtain Fixtures.
Brill Co., The J. G.
Du Pont Fabrikoid Co.
Electric Service Supplies Co.
Pantascote Co.
St. Louis Car Co.

Cutting Apparatus, Oxy-Acetylene.
Imperial Brass Mfg. Co.
Milburn Co., The Alex.
Oxweld Acetylene Co.

HENSLEY

Fool-Proof Trolley Harps



Make it impossible for the trolley wire to lodge anywhere but in the correct slot in the trolley wheel.

The conductor can be sure that so long as the pole does not jump up on release, the wheel is on the wire in its proper position.

The Best Combination

and the best protection against trouble is a Hensley Harp on a Hensley Wheel. Write for the Hensley Catalog describing the full line.

Hensley Trolley & Mfg. Co.
Detroit, Mich.



Weston

**Electrical
Indicating
Instruments**

are unqualifiedly superior to any other instruments designed for the same service.

A.C. or D.C. Switchboard or Portable Instruments for every field of Indicating Electrical Measurement. In writing for catalogs and bulletins, please specify the field that interests you.

WESTON ELECTRICAL INSTRUMENT CO.

21 Weston Avenue, Newark, N. J.
23 Branch Offices in the Larger Cities.

B. A. Hegeman, Jr., President; Charles C. Castle, First Vice-President; E. D. Hillman, Secretary and Engineer; Harold A. Hegeman, Vice-President and Treasurer; Fred C. Dunham, Assistant to President.

NATIONAL RAILWAY APPLIANCE COMPANY

50 East 42d St., NEW YORK CITY

Hegeman-Castle Corporation Chicago
National Railway Appliance Co., Washington, D. C.

RAILWAY SUPPLIES

Selling Agents for Tool Steel Gears and Pinions, Johnson Fare Boxes, Perry Side Bearings, Hartman Centering Center Plates, Wasson Trolley Bases, Rimco Rubber Insulated Pliers, Garland Ventilators, Electric Arc Welders, High Class Railway Varnishes and Enamels, Axles and Forgings.

Special Agents for Tool Steel Gear & Pinion Co., Rubber Insulated Metals Corp., Johnson Fare Box Co., C. & C. Electric & Mfg. Co., Holden & White, Inc., General Agents for Anglo-American Varnish Co., Eastern Agents for Union Fibra Co., Eastern & Southern Agents for Lucile Steel Co.

MORGANITE BRUSHES



*-for good
commutation*

THE MORGAN CRUCIBLE
COMPANY

MAIN OFFICE and FACTORY:

510 West 38th Street, New York
City. DISTRICT AGENTS: Lewis
& Roth, Philadelphia; Electrical
Engineering & Mfg. Co., Pitts-
burgh; W. L. Rose Equipment
Co., St. Louis, Mo.; Herzog Elec-
tric & Engineering Co., San Fran-
cisco, Cal.; W. R. Hendrey Co.,
Seattle, Wash.; Charles Farnham,
Los Angeles, Cal.



Are You
Getting
the "Dust-Loos" Hair Hook?



Get those coils back into service—quick!

Don't let LABOR SHORTAGE hold them up in your coil department. You can't get more men—but you can save time and money by sending the coils to us for re-insulation with

SALAMANDER Pure Asbestos

We will return them promptly—better insulated and more durable than when new.
"Salamander" asbestos wire excels in insulating value and cannot burn out under the severest overload. Leading electric railways are our best customers. Write us for details now.

Independent Lamp & Wire Co., Inc.

OFFICES:

FACTORIES:

1737 Broadway, New York York, Pa., and Weehawken, N. J.

WHAT AND WHERE TO BUY

Derailing Devices.
Cleveland Frog & Crossing Co.

Destination Signs.
Columbia M. W. & M. I. Co.
Creshead Engrg. Co.
Electric Service Supplies Co.

Detective Service.
Wisch Service, P. Edward.

Door Operating Devices.
Consolidated Car Heating Co.
National Pneumatic Co., Inc.
Safety Car Devices Co.

Doors, Asbestos.
Johns-Manville Co., H. W.

Doors and Door Fixtures.
Brill Co., The J. G.
Hale & Kilburn Corp.

Doors, Folding Vestibule.
National Pneumatic Co., Inc.

Draft Rigging. (See Couplers, Car.)

Drills, Track.
American Steel & Wire Co.
Electric Service Supplies Co.
Long Co., E. G.
Niles-Bement-Pond Co.
Ohio Brass Co.

Dryers, Sand.
Electric Service Supplies Co.
Zelnicker Supply Co., W. A.

Electrical Wires and Cables.
Roebling's Sons Co., J. A.

Engineers, Consulting, Contracting and Operating.
Archbold-Brady Co.
Arnold Co., The.
Beeler, John A.
Bylesby & Co., H. M.
Ford, Bacon & Davis.
Republic Engineers Inc.
Richey, Albert S.
Rumeny Co., R. R.
Sanderson & Porter.
Sargent & Lundy.
Seefeld Engineering Co.
Sloan, Indle, Feustel & Freeman
Stone & Webster.
White Companies, The J. G.
Woodmansee & Davidson Engineering Co.

Engines, Gas and Oil.
Westinghouse Elec. & M. Co.

Engines, Steam.
Westinghouse Elec. & M. Co.

Fare Boxes.
Brill Co., The J. G.
Cleveland Fare Box Co.
International Register Co. The
Johnson Fare Box Co.
National Railway Appliance Co.
Ohmer Fare Register Co.

Fences, Woven Wire and Fence Posts.
American Steel & Wire Co.
Page Steel & Wire Co.
Standard Steel Mould Co.

Fenders and Wheel Guards.
Brill Co., The J. G.
Cleveland Fare Box Co.
Consolidated Car Fender Co.
Electric Service Supplies Co.
Star Brass Works.
Trolley Supply Co.
Wood Co., Charles N.

Fibre and Fibre Taping.
Johns-Manville Co., H. W.
Westinghouse Elec. & M. Co.

Field Colls. (See Colls.)

Filters, Water.
Seale & Sons Co., Wm. B.

Fire Extinguishing Apparatus.
Johns-Manville Co., H. W.

Fire-Proofing Materials.
Johns-Manville Co., H. W.

Floodlights.
Crouse-Hinds Co.
Electric Service Supplies Co.

Flooring, Composition.
American Mason Safety T. Co.
Johns-Manville Co., H. W.

Forgings.
Columbia M. W. & M. I. Co.
Eureka Co.
Laclede Steel Co.
Standard Steel Works Co.

Fuses and Fuse Boxes.
Chicago Fuse Mfg. Co.
Columbia M. W. & M. I. Co.
D & W Fuse Co.
General Electric Co.
Johns-Manville Co., H. W.
Westinghouse Elec. & M. Co.

Fuses, Refillable.
Columbia M. W. & M. I. Co.
Economy Fuse & Mfg. Co.
General Electric Co.

Gages, Oil and Water.
Ohio Brass Co.

Gaskets.
Johns-Manville Co., H. W.
Power Specialty Co.
Westinghouse Trac. Brake Co.

Gas-Electric Cars.
General Electric Co.

Gas Producers.
Westinghouse Elec. & M. Co.

Gates, Car.
Brill Co., The J. G.

Gear Blanks.
Carnegie Steel Co.
Standard Steel Wks. Co.

Gear Cases.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Westinghouse Elec. & M. Co.

Gears and Pinions.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
National Ry. Appliance Co.
Nuttall Co., R. D.

Generating Sets, Gas-Electric.
General Electric Co.

Generators.
Dick, Kerr & Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Gongs. (See Bells and Gongs.)

Graphite.
Morgan Crucible Co.

Grates, Chain.
Green Eng's Co.

Greases. (See Lubricants.)

Grinding Blocks & Wheels.
Railway Track-work Co.

Grinders and Grinding Supplies.
Indianapolis Switch & Frog Co.
Metal & Thermit Corp.
Railway Track-work Co.

Guards, Trolley.
Electric Service Supplies Co.
Ohio Brass Co.

Hurps, Trolley.
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
More-Jones Brass & M. Co.
Hensley Trolley & Mfg. Co.
Nuttall Co., R. D.
Star Brass Works.
Western Electric Co.

Headlights.
Crouse-Hinds Co.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
St. Louis Car Co.
Trolley Supply Co.

Headlining.
Pantacote Co.

Heaters, Car, Electric.
Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
Smith Heater Co., Peter.

Heaters, Car, Hot Air and Water.
Cooper Heater Co.
Smith Heater Co., Peter.

Heaters, Car, Stove.
Electric Service Supplies Co.
Smith Heater Co., Peter.

Hoists and Lifts.
Columbia M. W. & M. I. Co.
Duff Manufacturing Co.
Ford Chain Block & Mfg. Co.
Niles-Bement-Pond Co.
Yale & Towne Mfg. Co.

Hose Bridges.
Ohio Brass Co.

Hose, Pneumatic and Fire.
Johns-Manville Co., H. W.

Hydraulic Machinery.
Niles-Bement-Pond Co.
Watson-Stillman Co.

Inspection.
Elec'l Testing Laboratories.

Instruments, Measuring, Testing and Recording.
Economy Electric Devices Co.
General Electric Co.
Johns-Manville Co., H. W.

Westinghouse Elec. & M. Co.
Weston Elec'l Instrument Co.

Insulated Wire Cutters.
Rubber Ins. Metals Corp.

Insulating Cloths, Paper and Tape.
Anchor Webbing Co.
General Electric Co.
Hope Webbing Co.
Irvington Varnish & Ins. Co.
Johns-Manville Co., H. W.
Niles Insulator Co.
Mitchell-Rand Mfg. Co.
Okonite Co.
Standard Paint Co.
Standard Underground Cable Co.
Standard Woven Fabric Co.
United States Rubber Co.
Westinghouse Elec. & M. Co.

Insulation. (See also Paints.)
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Johns-Manville Co., H. W.
Mitchell-Rand Mfg. Co.
Okonite Co.
United States Rubber Co.
Westinghouse Elec. & M. Co.

Insulators. (See also Line Material.)
Anderson M. Co., A. & J. M.
Creshead Engrg. Co.
Drew Elec. & Mfg. Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
General Electric Co.
Johns-Manville Co., H. W.
Macallen Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

Insulator Piles.
Electric Service Supplies Co.
Hubbard & Co.

Insurance, Fire.
Marsh & McLennan Co.

Inventions, Developed and Perfected.
Peters & Co., G. D.

Jacks. (See also Crennes, Hoists and Lifts.)
Brill Co., The J. G.
Buckeye Jack Mfg. Co.
Columbia M. W. & M. I. Co.
Duff Manufacturing Co.
National Ry. Appliance Co., Ltd.
Templeton Kenly & Co., Ltd.
Watson-Stillman Co.

Joints, Rail.
Carnegie Steel Co.
Lackawanna Steel Co.
Rail Joint Co.
Zelnicker Supply Co., Inc., W. A.

Journal Boxes.
Bemis Car Truck Co.
Brill Co., The J. G.
Garney Ball Bearing Co.
Railway Roller Bearing Co.
S K F Ball Bearing Co.

Junction Boxes.
Johns-Manville Co., H. W.
Standard Underground Cable Co.

Laboratories.
Elec'l Testing Laboratories.

Lamp Guards and Fixtures.
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Lamps, Arc and Incandescent.
Anderson M. Co., A. & J. M.
General Electric Co.
Westinghouse Elec. & M. Co.

Lamps, Signal and Marker.
Nichols-Lintern Co.
Ohio Brass Co.

Lathes, Car Wheel.
Niles-Bement-Pond Co.

Lights, Portable Carbide.
Milburn Co., The Alex.

Lighting Regulators, Car.
Holden & White, Inc.

Lightning Protection.
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

Line Material. (See also Brackets, Insulators, Wires, etc.)
Anderson M. Co., A. & J. M.
Archbold-Brady Co.

Columbia M. W. & M. I. Co.
Creshead Engrg. Co.
Dick, Kerr & Co.
Dossert & Co.
Drew Elec. & Mfg. Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
Eureka Co.
General Electric Co.
Holden & White, Inc.
Hubbard & Co.
Johns-Manville Co., H. W.
Macallen Co.
More-Jones Brass & M. Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

Locks.
Yale & Towne Mfg. Co.

Locomotives, Electric.
Brill Co., The J. G.
General Electric Co.
McGuire-Cummings Mfg. Co.
Westinghouse Elec. & M. Co.

Lubricating Engineers.
Galena-Signal Oil Co.

Lubricants, Oil and Grease.
Borne, Scrymser Co.
Galena-Signal Oil Co.

Lumber. (See Poles, Ties, Posts, etc.)

Machine Work.
Columbia M. W. & M. I. Co.
Holden & White, Inc.

Machine Tools.
Columbia M. W. & M. I. Co.
Niles-Bement-Pond Co.
Watson-Stillman Co.

Manganese Parts.
Bemis Car Truck Co.

Mats.
Johns-Manville Co., H. W.

Meters, Car, Walther.
Economy Electric Devices Co.

Meters (See Instruments.)

Mien.
Macallen Co.
Mechanical Rubber Co.

Mirrors for Motormen.
Drew Elec. & Mfg. Co.

Motormen's Seats.
Electric Service Supplies Co.
Wood Co., C. N.

Motor, Generator, Bonding and Welding.
Lincoln Bonding Co.

Motors and Generators Sets.
General Electric Co.

Motors, Electric.
Dick, Kerr & Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Motor Leads.
Dossert & Co.

Nuts and Bolts.
Barbour-Stockwell Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Hubbard & Co.
Lackawanna Steel Co.

Oils. (See Lubricants.)

Overhead Equipment. (See Line Material.)

Oxy-Acetylene. (See Cutting Apparatus, Oxy-Acetylene.)

Packing.
Johns-Manville Co., H. W.
Power Specialty Co.
United States Rubber Co.
Westinghouse Trac. Brake Co.

Packing Rings.
Johns-Manville Co., H. W.

Paints and Varnishes. (Insulating.)
Holden & White, Inc.
Irvington Varnish & Ins. Co.
Johns-Manville Co., H. W.
Niles Insulator Co.
Mitchell-Rand Mfg. Co.
Standard Paint Co.

Paints and Varnishes. (Preservative.)
Johns-Manville Co., H. W.
Standard Paint Co.

Paints and Varnishes for Woodwork.
National Railway Appliance Co.

Paving Bricks, Filler and Stretcher.
Nelsonville Brick Co.

Paving Material.
American B. S. & Fdry. Co.
Nelsonville Brick Co.



THESE TOOLS

PUT A PUNCH IN YOUR MAINTENANCE GANG

They are "Imperial" Pneumatic Tie Tampers

You can maintain your usual progress with 50% to 70% less tamping labor. The men released can be advantageously employed on other work. "Imperial" Tampers not only speed up the work but they turn out a superior quality—track is more evenly and firmly ballasted.

They are also applicable to cutting asphalt, breaking up concrete, picking out paving blocks—work that by other means is slow and by comparison very costly. Every advantage is on the side of the air tools—speed, adaptability, inexpensive maintenance, low power cost.

Shall we send you Bulletin 9023?

INGERSOLL-RAND COMPANY

11 Broadway, New York

Offices the World Over

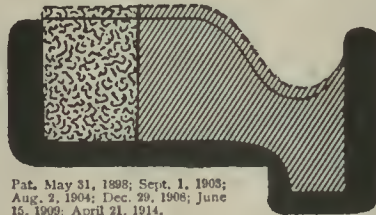
165 Q. Victoria St., London

90-TT



Wheel Condition No. 6

When only the outer part of tread needs grinding this arrangement of abrasive and non - abrasive material in the Wheel Truing



Pat. May 31, 1898; Sept. 1, 1903;
Aug. 2, 1904; Dec. 29, 1906; June
15, 1909; April 21, 1914.

Brake Shoe will correct matters—and without the car losing a minute's service.

Wheel Truing Brake Shoe Co.
Detroit Michigan

The Art of Buying

is as much a reality as is the Art of Selling. Advertising of the right kind helps the *buyer* as much as it does the seller.

The Electric Railway Journal Advertising Service Department helps advertisers prepare advertising copy of real interest and use to Journal readers.

The Advertising Service Department is ready to serve you, Mr. Manufacturer.

"LE CARBONE"
CARBON BRUSHES



Le Carbone
Carbon Brushes are
uniform. They talk
for themselves.

W. J. Jeandron
173 Fulton Street
New York City

Pittsburgh Office:
636 Wabash Building

Canadian Distributors:
Lyman Tube & Supply Co., Ltd.
Montreal and Toronto

Pickups. (Trolley Wire.)
Electric Service Supplies Co.
Ohio Brass Co.

Pinion Pullers.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
Wood Co., C. N.

Pinions. (See Gears.)

Pins, Case Hardened, Wood and Iron.
Bemis Car Truck Co.
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse Trac. Brake Co.

Pipe.
National Tube Co.

Pipe Fittings.
Power Specialty Co.
Standard Steel Works Co.
Watson-Stillman Co.
Westinghouse Trac. Brake Co.

Pilers, Insulated.
Electric Service Supplies Co.
National Railway Appliance Co.
Rubber Ins. Metals Corp.

Pneumatic Hose.
Westinghouse Trac. Brake Co.

Poles, Metal Steel.
Electric Railway Equipment Co.
Hubbard & Co.
National Railway Appliance Co.

Pole Sleeves.
Drew Elec. & Mfg. Co.

Poles, Ties, Posts, Piling and Lumber.
Carney & Co., B. J.
Lindley Bros. Co.
Northern White Cedar Assn.
Page & Hill Co.
Valentine-Clark Co.
White Marble Lime Co.

Poles and Ties, Treated.
Lindley Bros.
Page & Hill Co.
Valentine-Clark Co.

Poles, Trolley.
Anderson M. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
National Tube Co.
Nuttall Co., R. D.

Pole Reinforcing.
Hubbard & Co.

Poles, Tubular Steel.
National Tube Co.

Footheads.
Okonite Co.

Power Saving Devices.
Arthur Power-Saving Recorder Co.
Railway Improvement Co.

Pressure Regulators.
General Electric Co.
Ohio Brass Co.
Westinghouse Trac. Brake Co.

Protective Devices
Philadelphia Electric Company
Supply Dept., The

Pumps.
Watson-Stillman Co.

Punches, Ticket.
American Railway Supply Co.
Bonney-Vehslage Tool Co.
International Register Co., The
Wood Co., C. N.
Woodman Mfg. & Supply Co., R.

Punching Machinery.
Watson-Stillman Co.

Purifiers, Feed Water.
Seale & Sons Co., Wm. B.

Rail Grinders. (See Grinders.)

Rails, Relaying.
Zelmaer Supply Company, Inc.
Walter A.

Rail Welding. (See Welding Processes and Apparatus.)

Railroad.
Brill Co., The J. G.
Electric Service Supplies Co.
Hale & Kilburn Corp.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.

Recorders, Power Saving.
Arthur Power-Saving Recorder Co.

Registers and Fittings.
Bonham Recorder Co.
Brill Co., The J. G.
Electric Service Supplies Co.

WHAT AND WHERE TO BUY

International Register Co., The
Ohmer Fare Register Co.
Rooke Automatic Register Co.

Reinforcing Concrete.
American Steel & Wire Co.

Repair Shop Appliances. (See also Coil Banding and Winding Machines.)
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

Repair Work. (See also Colls. Armature and Field.)
Cleveland Armature Works.
Columbia M. W. & M. I. Co.
General Electric Co.
Independent Lamp & W. Co.
King-Coil Mfg. Co.
Westinghouse Elec. & M. Co.

Replacers, Car.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

Resistance, Grid.
Columbia M. W. & M. I. Co.

Resistance, Wire and Tube.
General Electric Co.
Westinghouse Elec. & M. Co.

Retrievers, Trolley. (See Catchers and Retrievers, Trolley.)

Rheostats.
General Electric Co.
Westinghouse Elec. & M. Co.
Mica Insulator Co.

Roofing, Building.
Johns-Manville Co., H. W.
Standard Paint Co.

Roofing, Car.
Johns-Manville Co., H. W.
Pantastote Co.

Rubber Specialties of all Kinds.
United States Rubber Co.

Sanders, Track.
Brill Co., The J. G.
Cleveland Fare Box Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Holden & White, Inc.
Nichols-Lintern Co.
Ohio Brass Co.
St. Louis Car Co.

Sash Fixtures, Car.
Brill Co., The J. G.

Sash, Metal, Car Windows.
Hale & Kilburn Co.

Seating Material. (See also Retention.)
Brill Co., The J. G.
Du Pont Fabrikoid Co.
Pantastote Co.

Sents, Car.
Brill Co., The J. G.
Hale & Kilburn Corp.
Peters & Co., G. D.
St. Louis Car Co.

Second-Hand Equipment. (See Searchlight Section.)
Archer & Baldwin.
MacGovern & Co.

Shades, Vestibule.
Brill Co., The J. G.

Shovels.
Hubbard & Co.

Signals, Car.
Nichols-Lintern Co.

Signals, Car Starting.
Electric Service Supplies Co.
Consolidated Car Heating Co.
National Pneumatic Co.

Signals, Highway Crossing.
U. S. Electric Signal Co.

Signal Systems, Block.
Electric Service Supplies Co.
Federal Signal Co.
Union Switch & Signal Co.
U. S. Electric Signal Co.
Wood Co., C. N.

Shock Adjusters. (See Brake Adjusters.)

Steel Wheels and Cutters.
Anderson M. Co., A. & J. M.
Bonney-Vehslage Tool Co.
Columbia M. W. & M. I. Co.

Drew Elec. & Mfg. Co.
Holden & White, Inc.
More-Jones Brass & M. Co.
Nuttall Co., R. D.

Snow-Plows, Removers, Sweepers, etc.
Brill Co., The J. G.
Consolidated Car Fender Co.
Columbia M. W. & M. I. Co.
McGuire-Cummings Mfg. Co.

Soldering and Brazing Apparatus. (See Welding Proc. & App.)

Solderless Connectors
Westinghouse Elec. & Mfg. Co.

Speed Indicators.
Johns-Manville Co., H. W.
Wood Co., C. N.
Woodman Mfg. & Supply Co., R.

Spikes.
American Steel & Wire Co.
Lackawanna Steel Co.

Splicing Compounds.
Johns-Manville Co., H. W.
Standard Woven Fabric Co.
United States Rubber Co.
Westinghouse Elec. & M. Co.

Splicing Sleeves. (See Clamps and Connectors.)

Springs, Car & Truck.
American Steel Foundries
American Steel & Wire Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Standard Steel Works Co.
Taylor Elec. Truck Co.
Union Spring & Mfg. Co.

Sprinklers, Track and Road.
Brill Co., The J. G.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.

Steps, Car.
American Mason S. T. Co.
Universal Safety Tread Co.

Stokers, Mechanical.
Babcock & Wilcox Co.
Green Engrg. Co.
Westinghouse Elec. & M. Co.

Storage Batteries. (See Batteries, Storage.)

Strand
Roebbling's Sons Co., J. A.

Straps, Car, Sanitary.
Holden & White, Inc.
Railway Improvement Co.

Structural Iron. (See also Bridges.)

Superheaters.
Babcock & Wilcox.
Power Specialty Co.

Sweepers, Snow. (See Snow-Plows, Sweepers and Brooms.)

Switchstands.
Indianapolis Switch & Frog Co.
Ramapo Iron Works.

Switches Lock
Wiles Switch Lock Co.

Switches, Track. (See Track, Special Work.)

Switches and Switchboards.
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Tampers, Tie.
Ingersoll-Rand Co.

Tapes & Cloth. (See Insulating Cloth, Paper and Tape.)

Telephones and Parts.
Electric Service Supplies Co.

Terminal Cables.
Standard Underground Cable Co.

Testing, Commercial and Electrical.
Electrical Testing Laboratories.

Testing Instruments. (See Instruments, Electrical, Measuring, Testing.)

Thermostats.
Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
Railway Utility Co.
Smith Heater Co., Peter.

Ticket Boxes.
Macdonald Ticket & Ticket Box Co.

Ticket Choppers and Destroyers.
Electric Service Supplies Co.

Tickets and Transfers.
American Railway Supply Co.

Ties, Mechanical.
Dayton Mechanical Tie Co.

Ties and Tie Rods, Steel.
Barbour-Stockwell Co.
Carnegie Steel Co.
International Steel Tie Co.

Ties, Wood. (See Poles, Ties, etc.)

Tools, Track and Miscellaneous.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Johns-Manville Co., H. W.
Railway Track-work Co.

Torches, Acetylene. (See Cutting Apparatus, Oxy-Acetylene.)

Towers and Transmission Structures.
Archbold-Brady Co.
Westinghouse Elec. & M. Co.

Track, Special Work.
Barbour-Stockwell Co.
Cleveland Frog & Crossing Co.
Columbia M. W. & M. I. Co.
Indianapolis Switch & Frog Co.
New York Switch & Crossing Co.
Ramapo Iron Works.

Transfers. (See Tickets.)

Transfer Insulating Machines.
Ohmer Fare Register Co.

Transfer Tables.
Archbold-Brady Co.

Transformers.
General Electric Co.
Westinghouse Elec. & M. Co.

Treads, Safety Stair Car Step.
American Mason Safety Tread Co.
Universal Safety Tread Co.

Trolley Bases.
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Holden & White, Inc.
More-Jones Brass & M. Co.
National Railway Appliance Co.
Nuttall Co., R. D.
Ohio Brass Co.
Trolley Supply Co.

Trolley Bases, Retrieving.
Holden & White, Inc.

Trolley Shoes.
Holden & White, Inc.
Miller Trolley Shoe Co.

Trolley Wire
Roebbling's Sons Co., J. A.

Trolleys and Trolley Systems.
Ford Chain Block & Mfg. Co.

Tracks, Car.
American Steel Foundries
Bemis Car Truck Co.
Brill Co., The J. G.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.
Taylor Elec. Truck Co.

Tubing, Steel.
National Tube Co.

Turbines, Steam.
General Electric Co.
Westinghouse Elec. & M. Co.

Turnstiles.
Percy Mfg. Co., Inc.

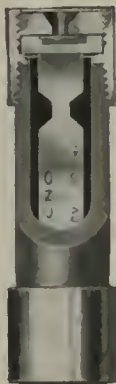
Valves.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

Varnishes. (See Paints, etc.)

Ventilators, Car.
Brill Co., The J. G.
Holden & White, Inc.
National Railway Appliance Co.
Nichols-Lintern Co.
Railway Utility Co.
St. Louis Car Co.

In Our Navy Yards and on our Fighting Ships **ECONOMY** renewable **FUSES**

For many successive years the U. S. Navy has protected vitally important electrical circuits ashore and afloat with **ECONOMY** renewable **FUSES**.



The **ECONOMY** Renewable **FUSE** is as superior to other fuses as the "Drop Out" Renewal Link is to other fuse links.



An inexpensive little "Drop Out" Renewal Link restores a blown Economy Fuse to its original efficiency.

HISTORY has repeated itself. A new contract has recently been awarded this company to fill the Navy's renewable fuse requirements for another year. As compared with the cost of Non-Renewable Fuses, the government has saved as high as \$76,480.00 on a single delivery to one navy yard.

In thousands of plants representing all branches of industry, Economy Fuses and "Drop Out" Renewal Links effect savings averaging approximately 80% of the annual fuse maintenance cost.

Order by brand from your electrical jobber or dealer.

Write for Catalog 17.

ECONOMY FUSE & MFG. CO.

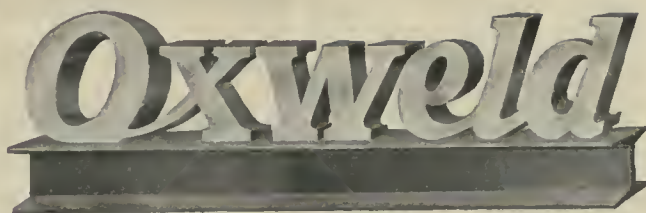
Kinzie and
Orleans Streets

CHICAGO
U. S. A.

Sole manufacturers of "ARKLESS"—the Non-Renewable Fuse with the "100% Guaranteed Indicator."

U. & U.

Economy Fuses are also made in Canada at Montreal



The Indispensable Process

is valiantly serving the street railway industry—has served it profitably for years. General repairs and reclamation in shop and car barn; cutting off or building up bad rail ends; rail bonding—even overhead joining—all have been bettered and cheapened by the use of Oxweld Oxy-Acetylene Equipment.

The Oxweld Injector Type Blowpipe works with constant efficiency on all pressures down to $\frac{1}{2}$ lb. per square inch. For this reason, wherever acetylene is used from cylinders because of portability—as in bonding and all other track work—the Oxweld Blowpipe has the advantage of utilizing a far greater proportion of their gas content than do ordinary blowpipes.

The Oxweld Low Pressure Acetylene Generator shown below is the type of installation most economical and satisfactory for stationary service in electric railway shops and car barns.

Write for Bulletin Series 700

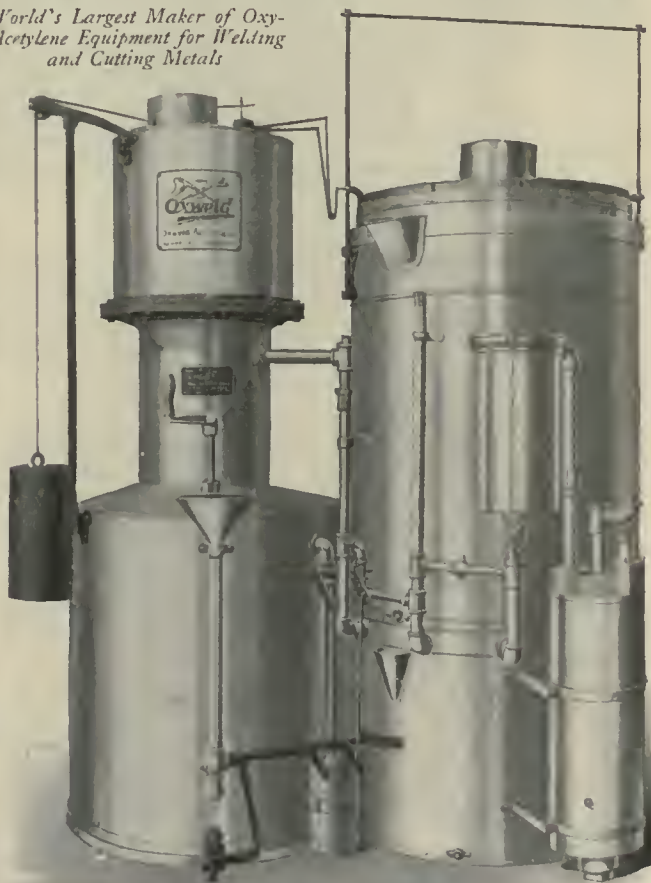
OXWELD ACETYLENE COMPANY

NEWARK, N. J.

CHICAGO

LOS ANGELES

World's Largest Maker of Oxy-Acetylene Equipment for Welding and Cutting Metals



Oxweld Low Pressure Acetylene Generator

Collier Service

at Greensboro, N. C.



There are only about a dozen cars a day on Greensboro's regular daily schedule.

How much real service could a car advertising contractor give to a job of that size unless he did a nation-wide business?

Look at these cards. Consider what it means to design scores and scores for each kind of busi-

ness so that the banker, the confectioner or other advertiser of any size community may be assured of returns from his car card advertising.

It is by assuring such returns that Collier Service makes revenue from car card advertising a permanent stabilized source of income to the electric railways of this country.

Barron G. Collier
INCORPORATED

Candler Building
220 West 42nd Street, New York City



Columbia Makes Most Any Metal Part a Car Needs



THIS picture shows only a small part of our heavy metal-working department..

In the left foreground are the frames of metal **car doors** and in the center just behind the block

and tackle are a batch of **gear cases**.

This is about the easiest way we know of to give you an idea of the Columbia range in car equipment.

Columbia Machine Works & Malleable Iron Co.

Atlantic Ave. and Chestnut St.

Brooklyn, N. Y.

TOOLS

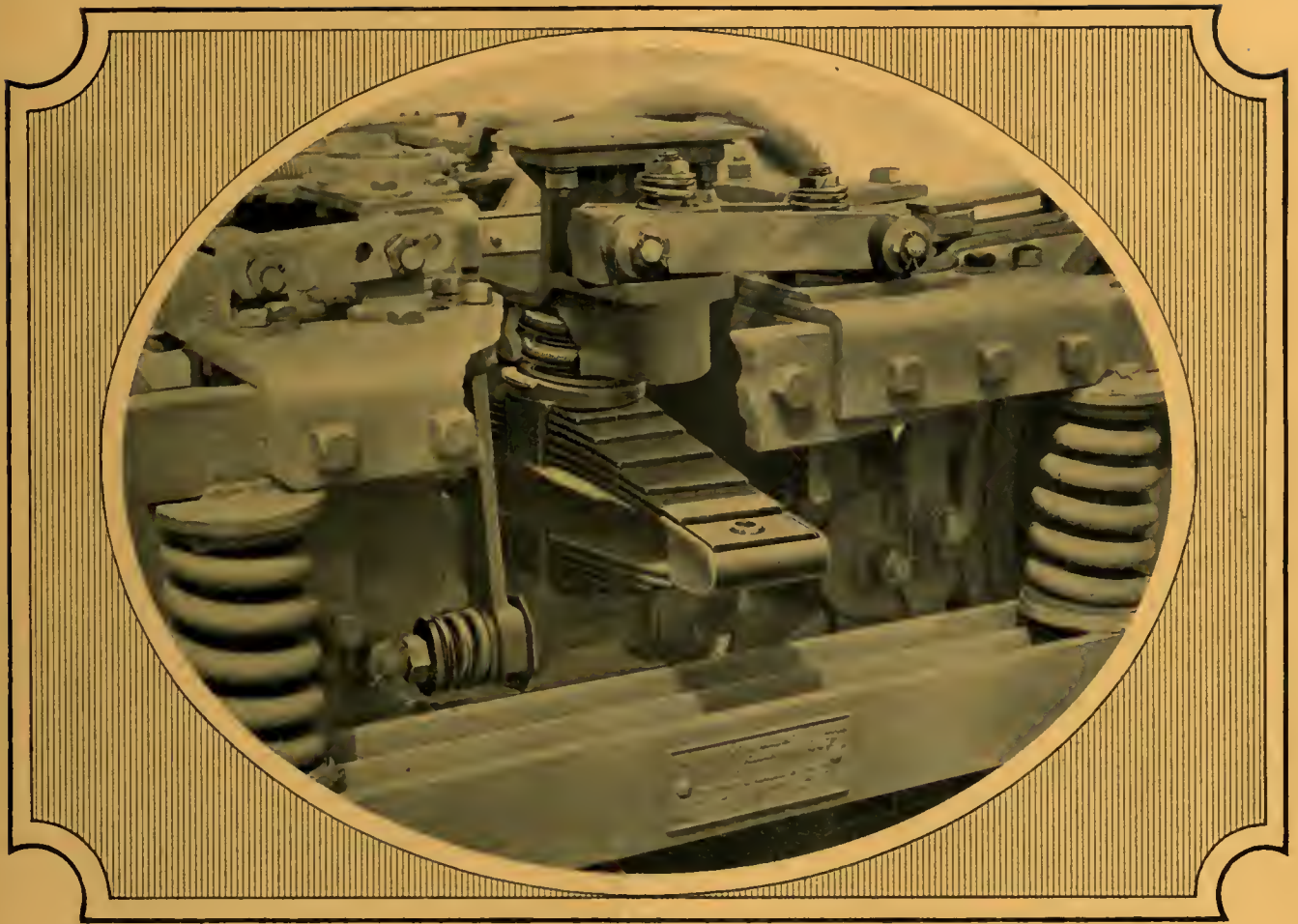
Armature and Axle Straighteners
Armature shaft straighteners
Armature buggies and stands
Babbittling molds
Banding and heading machines
Car hoists
Car replacers
Coil taping machines for armature leads
Coil winding machines
Pinion pullers
Pit jacks
Signal or target switches
Tension stands

W. R. Kerachner Co., Inc., N. Y.
Holden & White, Inc., Chicago
F. F. Bodler, San Francisco
Railway & Power Eng. Co., Ltd.,
Toronto, Ont.



CAR EQUIPMENT

Armature and Axle Bearings
Armature and field coils
Bearings (Axle and Armature)
Brush-holders and Brush-holder springs
Brake, door and other handles
Brake forgings, riggings, etc.
Car trimmings
Commutators
Controller handles
Forgings of all kinds
Gear cases (steel or malleable iron)
Grid resistors
Third-rail shoe beams and accessories
Trolley poles (steel) and wheels



The Brill 27-MCB High-Speed Truck

OF the four elements of the Brill 27-MCB truck, shown in the illustration, the solid forged side frame with its powerful forged, fold-over gusset plates bolted to the transoms through forged single and double corner brackets, can be absolutely depended on for strength, durability and squareness. The spiral springs under the ends of the bolster that automatically come into play under less than a full seated load, known as the Gradu-

ated Spring System, together with the Bolster Guides, which hold the bolster upright without interfering with its motion, give a spring action that is singularly smooth. The Swing Link Dampener effectually prevents swaying and causes the car body to return steadily and gently to its normal position after swinging out at curves. These four elements are essential to the strength and easy riding qualities of trucks for high-speed service.

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.

G. C. KUHLMAN CAR CO.
CLEVELAND, OHIO



AMERICAN CAR COMPANY
ST. LOUIS, MO.

WASON MANUFACTURING CO.
SPRINGFIELD, MASS.

More GE-200 Motors for Washington Railway & Electric Company

In the Capital of our Nation it is now of paramount importance to give the most dependable railway service. Based on years of successful service 50 additional four-motor GE-200 (40 hp.) equipments were recently purchased.



General Electric Company

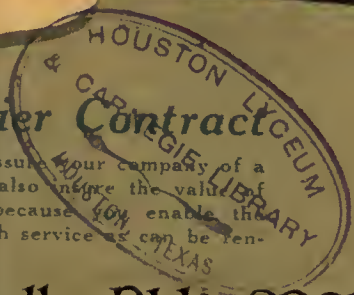
ELECTRIC RAILWAY JOURNAL

August 10, 1918



When You Sign a Collier Contract

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Doing Things

“THE transportation branch of the Emergency Fleet Corporation are surely doing things for the shipyards,” said the President to the General Manager.

“They organized, studied conditions, and ordered cars and equipment in large numbers. It’s extremely encouraging to see things handled in this way, especially when the financial, and all other phases of the problem, are fully considered and equitably adjusted.”

“Yes, it is,” said the General Manager, “I just learned that they provided a large number of cars for Baltimore, and they made no mistake when they selected a real husky motor, the Westinghouse No. 532-B, 50 horsepower, with HL Control. That’s the type of equipment to use for handling heavy loads.”

Westinghouse Electric
East Pittsburgh,



& Manufacturing Co.
Pennsylvania

Electric Railway Journal

H. W. BLAKE, *Editor*

Contents

Quick Service Between Buffalo and Niagara Falls

High-speed line is now in full operation—salient features are cantenary construction with heavy overhead bridges, a long, high fill to obviate the necessity for numerous grade crossings and a type of car especially well adapted to the conditions.Page 226

Automatic Rate System Is Fair to All

A year's experience with a service-at-cost franchise in Westerville, Ohio, shows desirability of flexible fares automatically adjusted. Harold W. Clapp gives details.Page 230

Meeting the Nation's Heavy Transportation Needs

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Patented



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If the common surface of two dielectrics conform to the direction of the Faraday tubes between their electrodes, and if the electrodes are properly formed, the highest insulation efficiency is obtained.

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See catalogue 6-A for dimensions and flashovers.

**Westinghouse Electric &
Manufacturing Co.**
East Pittsburgh, Pa.

*Sales Offices in All Large
American Cities*



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Air Brakes for Every Service



"SAFETY" Car, Northern Texas Traction Co.,
Fort Worth, Texas, Weight, 14,000 lbs.
Semi-Automatic Brake.

We supply air brakes for all kinds of electric railway cars from the light weight, "SAFETY" car to those in heavy, multiple-unit train service.

We recommend semi-automatic schedules for single city cars, with and without occasional trailers;

automatic brakes for trains of two or three cars in city, suburban and interurban service; and universal variable-load brake, electrically controlled, for elevated and subway trains.

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Whether it is on tangents or on curves, Phono-Electric withstands best the grinding of the trolley wheel.

The Portland, Oregon, Railroad Light & Power Company thinks so evidently, for it has Phono-Electric on many curves and also on 8 miles of double track.

Variations in alignment and in the positions of the trolley base may not look big to the eye, but just ask the line foreman why he wants something that will meet the conditions best—in short why he wants

Phono-Electric

Bridgeport Brass Company
Bridgeport **Connecticut**

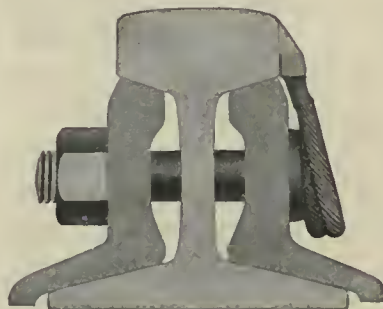


PRODUCTS

Quality First



Installing O-B Gas Weld Bonds



Section of O-B G W Bond on rail. Notice beveled shape of terminal.

O-B GAS WELD BONDS

When Men Are Scarce and Coal Is High

Two men are a full crew for installing O-B Gas Weld Bonds. One of them scrapes scale and dirt from the rail and clamps the bond in position. The other does the welding. Neither need be an expert.

On rebonding much labor is saved by O-B Gas Weld Bonds. The splice bar is not disturbed. In paved streets one or two bricks are removed and that leaves plenty of room. For scattered rebonding the equipment may be handled easily by one man.

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Efficient bonding will relieve overtaxed generating equipment. If your power plant is overloaded at the peak hour, investigate your bonding. That may be the easiest solution.

Good bonding betters operation in many ways. O-B Bonds are good bonds.

*Send for interesting illustrated booklet,
"Gas Weld Bonding."*

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Type G. W. (Patented)
(All Copper Terminal)

O-B Gas Weld Bonds have exclusive patented features which are essential if the full benefit is to be obtained from the oxy-acetylene process.



Type S. T. (Patented)
(Steel Armored Terminal)
Right terminal sectioned to show
how copper is headed over.

Fifteen Millions of Dollars for Track Replacement Last Year

That, according to authoritative estimate, was the size of the bill which the electric railway industry in the U. S. and Canada had to pay in 1917 for replacing only 375.4 miles of presumably old, worn-out, no longer usable track.

There is, of course, no data to show the facts, but it would certainly be interesting to know how much of this expenditure might have been saved by *repairing* instead of *replacing* the track structure and making the old rails as good as new by the use of

RECIPROCATING TRACK GRINDERS

All at a fraction of the amount spent for complete replacement.

Enormous savings have been made in just that manner by companies having stretches of track which appeared to be hopeless for further use.

It would be still more interesting and profitable as a demonstration of the value of economical track grinding to know how many *more* years of useful life *all* of this track might have had if Reciprocating Grinders had been put to work on

it several years ago and the consequent strain and wear on track structure and rails had been prevented by keeping rails constantly smooth and level.

More than a hundred railways throughout the world have demonstrated the immediate and eventual economies resulting from the use of Reciprocating Grinders.

We are ready to prove these same values to you on your own tracks without any expense to you.



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Permanent Track at Less Cost
Any Type Base — Open or Paved Track

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WESTERN RED CEDAR POLES

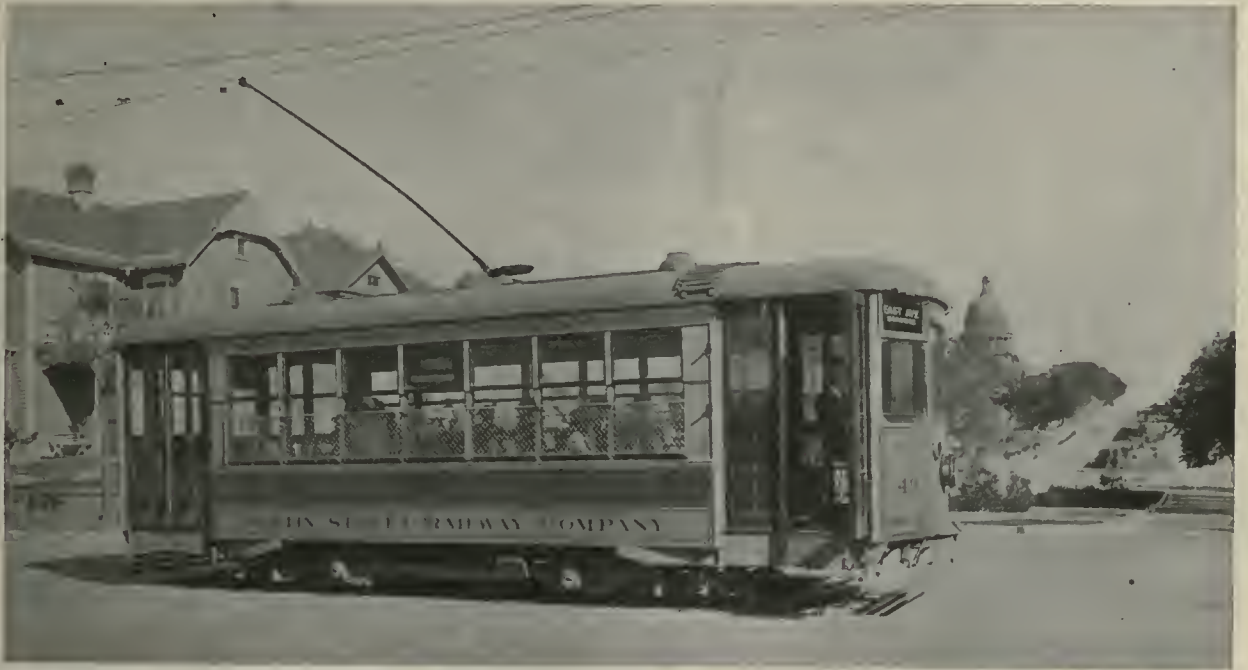
Strong-Straight-Sightly

Views at the top of the page, at the left, and in the lower right-hand corner show lines of the Empire District Electric Company, of Joplin, Missouri, built of 35-foot Western Red Cedar Poles. Views include a Four-Pole Round Corner and a Four-Pole Square Corner. The poles carry seven wires, as follows: Three 1/0 copper line wires; two No. 6 B.W.G. iron ground wires, and two No. 10 copper telephone wires.

Illustration in the left-hand corner shows part of the Chicago, Milwaukee & St. Paul Railway Electrification near Piedmont, Montana, on the East Side of the Continental Divide. Western Red Cedar Poles were used throughout on this great electrification project.

WESTERN RED CEDAR ASSOCIATION, Spokane, Wash.





Do As Austin Has Done

Capital of the Lone Star State
Another ESSCO Better Service Town

The Austin Street Railway was one of the first to see the many merits of the Light-Weight Safety Car.

In planning to provide this improvement for its patrons, the company gave careful thought to the specialists for the car as well as to the type of car.

And this was its decision:

"Golden Glow" Incandescent Headlights
Faraday High Voltage Car Signals
Keystone Trolley Catchers
Keystone Rotary Gongs
Keystone Air Sanders
International Registers

ELECTRIC SERVICE SUPPLIES CO.

Manufacturer of Railway Material and Electrical Supplies

PHILADELPHIA
17th and Cambria Sts.

NEW YORK
50 Church St.

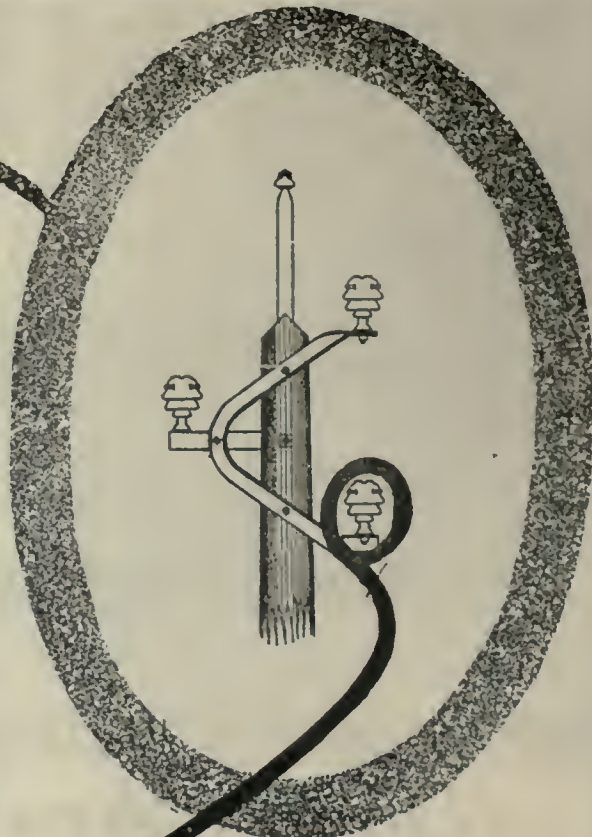
CHICAGO
Monadnock Bldg.

Canadian Distributors: Lyman Tube & Supply Co., Montreal, Toronto, Winnipeg.



One 33,000 volt line on Bo-Arrow arms and Peirce Forged Steel Pins. Two 33,000 volt lines on Steel Angle arms and Peirce pins. (Pittsburgh, Pa.)

Bo-Arrow Arms and Peirce Pins



A close-up view of the forged steel Peirce Pin for high-tension lines. The threads of the thimble fit loosely over the threads of the pin, and a thin cork disc is provided between the top of the pin and the thimble. Under expansion the pin simply rides up further in the thimble, the cork disc compressing. None of the strain is communicated to the insulator.



Guaranteed to stand rated strains without danger to the insulator.

The Hardware MAKES the Line—Hubbard makes THE Hardware

HUBBARD AND COMPANY
PITTSBURGH

Canadian Manufacturers and Distributors: Arme Stamping & Tool Works, Hamilton, Ontario



For War-Busy Washington Hundreds of National Pneumatic Equipments

are being installed at the National Capital on both new and remodeled cars.

This means that the Capital Traction and Washington Railway & Electric Companies will be able—car for car—to give more mileage and service than would be possible with cars having hand-operated doors.

It also means that more platform men will stick to their jobs and that those who do leave for war duties can be replaced by individuals of slighter physique or by *women*.

One way of saving man-power is to replace it by automatic power; and in the case of *National Pneumatic Door and Step Control*

Replacement of Manual Control by Air Means Improvement of Service

We shall be glad to suggest similar modernization of your cars.

NATIONAL PNEUMATIC COMPANY
INC.

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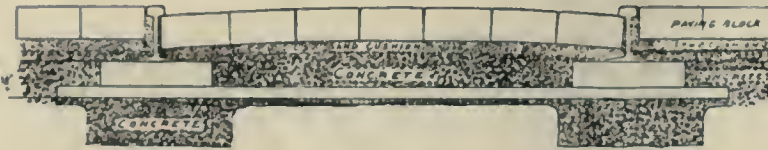




Cost Comparison

One very strong point in favor of Mechanical Ties is in the cost of installing. Study carefully the figures of comparison. They are conclusive proof of the superiority of

DAYTON MECHANICAL TIES



Excavation for Mechanical Tie

Track Construction
7-in. rail
4 1/2-in. mechanical tie
6 in. x 1 ft. 6 in. for tie foundation
Total excavation for track
11 1/2 in. x 8 ft. 6 in. x 1000 ft. = 302 cu.yd.
6 in. x 1 ft. 6 in. x 2000 ft. = 55 1/2 cu.yd.

Excavation for Paving
4-in. paving block
1 1/2-in. sand cushion
6-in. concrete foundation
Total excavation for paving 11 1/2 in. x
8 ft. 6 in. x 1000 ft. = 302 cu.yd.

Excavation Below Paving Line 55 1/2 yd.

Cost

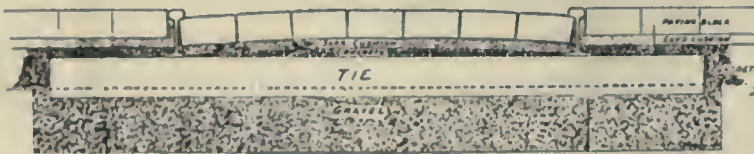
3-ft. centers		
55 1/2 cu.yd. excavation,	\$1.25.....	\$69.88
300 track ties	2.50.....	750.00
33 joint ties	5.75	189.75
55 1/2 cu.yd. concrete	6.00.....	333.00
Labor.....		48.00

\$1390.63

\$1.39 per foot

The figure of \$48 for labor is the actual experience of the D. S. & X.S. Ry. Co. in laying track with labor 30 cents an hour.

WOOD TIES IN GRAVEL BALLAST



Excavation for Wood Tie

Track Construction
7 in. Rail
6 in. Tie
8 in. Ballast
Total Excavation For Track:
21 in. x 8 1/2 ft. x 1000 ft. =
55 1/2 cu.yd.

Excavation For Paving
4 in. Paving Block
1 1/2 in. Sand Cushion
6 in. Concrete Foundation
Total Excavation for Paving.
11 1/2 in. x 8 ft. 6 in. x 1000 ft =
302 cu.yd.

Excavation Below Paving Line 249 Cu. Yd.

Cost

2-in. centers		
249 cu.yd. Excav.	\$1.25	\$311.25
249 cu.yd. Ballast	1.50	373.50
500 W.O. Ties	1.25	625.00
6 Kegs Spikes	8.00	48.00
Labor		350.00

1707.95

\$1.707 per foot.

Labor of \$350.00 includes laying track, spiking, gauging, aligning and surfacing at 35 cents per foot of track.

Installing Wood Ties\$1.70 per foot
Installing Mechanical Ties\$1.39 per foot
Mechanical Ties Save41c per foot

A saving of nearly 25%—by using Mechanical Ties.

Your inquiry for full particulars regarding Mechanical Railway Ties will be a step in the direction of better economy.

WRITE TODAY

THE DAYTON MECHANICAL TIE CO.

201 Third Street Arcade
DAYTON, OHIO





On New Year's Day, 1777, Richmond's Tavern in Trenton, N. J., shown here, was utilized as

Washington's Headquarters

There were 70 houses at that time in Trenton, mostly located on two parallel streets, King and Queen Streets. Little progress had been made since, in 1714, William Trent, a Philadelphia merchant, bought a large tract of land, built a country home on it and invited others to settle there. The place was called Trent's Town, gradually shortened to *Trenttown* and *Trenton*.

The "Swamp Angel," the great gun with which the Federal troops bombarded Charleston, South Carolina, in August, 1863, stands in Perry Street. Trenton is the greatest pottery city in

the United States—its output being nearly 10% of the total pottery products of this country.

Its electric transportation development has been remarkable during the past few years. Some of the best high-speed interurban cars in the world are running over the tracks between Newark and Trenton, while excellent trolley connections join the latter city with Philadelphia, and through traffic between New York and Philadelphia via trolley car is no longer a matter of an all-day trip.

Galena Oils

and Galena Service have shown their value in such transportation developments throughout the country not by merely producing the right materials but by assisting in the adaptation of these materials in such a way as to insure the highest lubrication efficiency.

Galena-Signal Oil Co.
Franklin, Pa.



Columbia Tools on the Job for You!

Turning Out Bearings



You will understand the perfection of Columbia-made products when we tell you that we have several hundred machine tools alone.

Practically each tool, be it drill, shaper, borer, grinder, planer or lathe, is handled by the same man day in, day out.

Such specification inevitably results in turning out the best possible work.

That's only one of the many reasons for using Columbia-made products.

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Atlantic Ave. and Chestnut St.

Brooklyn, N. Y.

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Armature shaft straighteners
Armature buggies and stands
Babbitting molds
Banding and heading machines
Car hoists
Car replacers
Coil taping machines for armature leads
Coil winding machines
Pinion pullers
Pit jacks
Signal or target switches
Tension stands

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F. F. Bodler, San Francisco
Railway & Power Eng. Corp., Ltd., Toronto, Ont.



CAR EQUIPMENT

Armature and Axle Bearings
Armature and field coils
Bearings (Axle and Armature)
Brush-holders and brush-holder springs
Brake, door and other handles
Brake forgings, riggings, etc.
Car trimmings
Commutators
Controller handles
Forgings of all kinds
Gear cases (steel or malleable iron)
Grid resistors
Third-rail shoe beams and accessories
Trolley poles (steel) and wheels

Save That Shovelful Through the Use of Rico Coasting Recorders

"With the schedule speed set as high as can be made with safety and reliability, there is necessarily a margin of time.

"This margin can be wasted by inefficient operation or it can be taken up in *coasting*, thus giving the maximum economy.

"The (Rico) Coasting Recorder simply tells the motorman and the manager how this margin, which is a necessary factor in electric railway operation, is being used.

"How it is used makes a difference of 10 to 20 per cent. in the coal bill."

From H. C. Kendall's article in the Electric Railway Journal for July 13, 1918, on what Rico Coasting Recorders have done at Denver since December, 1912, to save coal.

The way to save this difference in coal is to use **THE RICO COASTING RECORDER.**

*The Only
Device That
Shows the
Slack in
the Line*



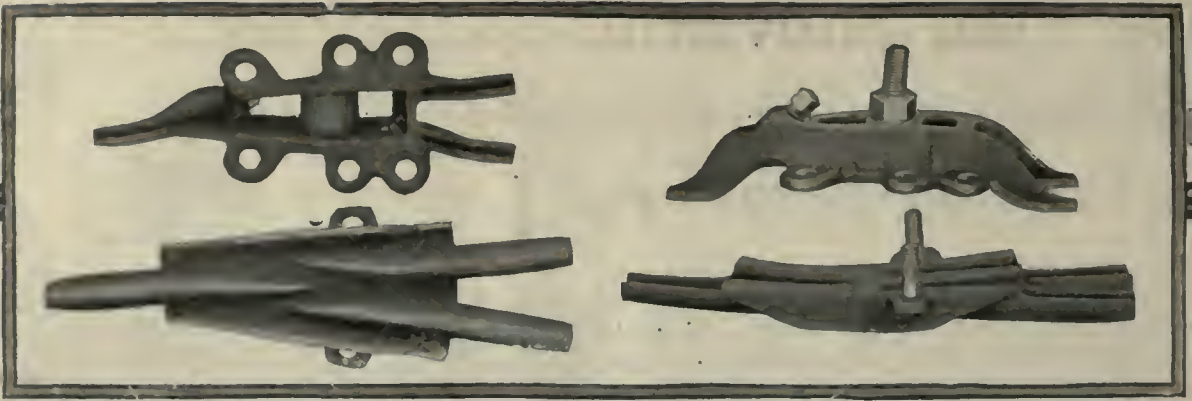
**SAVE
THAT
SHOVELFUL**



**Time Is the Essence
of Railroading**

Railway Improvement Co.

61 Broadway, New York



G-E Light Weight Frogs with Renewable Wearing Pan

Keep down maintenance costs.

Have Low First Cost.

Wearing part replaced at one-half the original cost.

Traffic schedule interference reduced to a minimum.

Changes made in two minutes. Handling of wires or pulling up tackle unnecessary. Just bolt on new pan.

General Electric Company

General Office  Schenectady, N. Y.

Sales Offices in All Large Cities

"Just bolt it on"

7442



A New Pan Makes the
Frog as Good as New

Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

Volume 52

New York, Saturday, August 10, 1918

Number 6

Does Commission Control Remove the Hazard of Investment?

THIS pertinent question is raised this week in the editorial columns of the *Engineering News-Record*. The paper points out that for years the public service commissions have stood on the principle that commission control removed the hazard of investment and that the public service corporations thus protected must therefore be content with a smaller rate of return; but it inquires whether the commissions are living up to their pronouncements at present. It admits that conditions are abnormal and that some measure of relief has been accorded in many cases, but thinks that the general question can be answered only in the negative. The most that can be claimed is that the regulatory authorities are trying to maintain credit of the companies, or perhaps their effort could more fairly be characterized as one to prevent bankruptcy. It then says that if the commissions, from considerations of policy or lack of power, have abandoned their intent to remove the hazard of investment in public utilities, the public is entitled to a frank admission of the facts. The corporations should not now be denied full relief from their extraordinary burdens and later on, in normal times, be limited again to a return restricted by the doctrine that commission control removes the hazard element.

The Fire Stop Is Obsolete

ONCE upon a time, as Hans Christian Andersen used to say, the electric car was the only horseless vehicle upon the street. Indeed, at one time in its history its speed appeared so terrific that every newspaper reader missed something in his daily life if he did not come across some headline like: "Modern Moloch Murders More." It was in those quiet days, vehicularly speaking, that a number of municipalities ordained that the untamed trolley car must come to a full stop at every street on which a fire station was housed near by.

In the fullness of time have come the automobile and motor truck which are at liberty to career and careen hither, thither and yon. For them there is neither a fixed track nor a fixed stop. They come and go as they list except for such regulation as may be imposed by a traffic officer. Then, too, the fire department vehicles have also changed in character. As most are motor-driven instead of horse-drawn, it is possible to steer them around corners and elsewhere with far greater ease than before. Why then should the street cars of this country have to continue to make thousands upon thousands of utterly useless fuel and time-wasting stops every day when the street car is actually the most sober vehicle on the city streets—the only one that literally

stays in its tracks. Surely no survey of needless stops is complete without listing these fire stops and requesting permission to abolish them in the cause of better service.

Is the One-Cent Fare Zone the Answer to the Fare Question?

IN A STATEMENT published elsewhere in this issue, Peter Witt, former street railway commissioner of Cleveland, sets forth his belief in the 1-cent fare zone as a solution to that most perplexing problem—the fare question. Briefly, his argument is that the low zone fare will encourage short-haul and off-peak riding and effectively combat jitney competition.

There is no question that zone systems in one form or other are receiving serious study these days from both railway managers and governmental regulative bodies. Statements by prominent railway men and recent decisions by public service commissions attest this. Likewise there can be no question, when it is viewed from the standpoint of the cost of service, that the old flat fare is not logical in that it does not proportion the charge for the transportation furnished to the cost of supplying it. But the same is true of the flat zone fare. It costs more per mile to carry a passenger 1 mile than to carry him 2 miles, so that even under the zone system a fairly large minimum charge can be justified on the basis of cost. In a way the problem is analogous to that of passenger interchange time. Just as the loading time per passenger is greater for one passenger than for a ten-passenger group, so is the cost per zone of transport for one zone greater than that for ten zones. In each case there is a certain fixed or constant quantity involved. In the fare problem, for example, platform time during the stop, increased energy consumption caused by the stop, fixed charges on equipment, etc., each item small in itself in the aggregate, forms an appreciable part of the cost of carrying a passenger for one zone. Where the passenger travels through a number of zones the subdivisions of the fixed charge become less and less as the number of zones increases, and the total zone cost approaches the actual carrying cost. As we understand it, Mr. Witt agrees in principle to this thought but favors a low initial fare and many zones with a reduction to the long-haul rider rather than fewer zones and a higher initial fare.

Will the 1-cent fare zones increase traffic? Undoubtedly, but to what extent it is hard to say. In fact, unfortunately, our knowledge as to the relation between traffic volume and fare variations, to say the least, is incomplete. While in a number of cases fares have been increased within the last year, either definite data relative to the effect of the increases on traffic volume are not yet available or local conditions have been so

changed by war-time exigencies as to render present conditions incomparable with those of previous years. If we may judge from such reports as are available, an increase in fares is followed by a greater or less decrease in the traffic. Conversely, it might be expected that a decrease in fare would increase the traffic, thus supporting, in a measure, Mr. Witt's contention that a low-rate zone fare would increase short-haul traffic, particularly in downtown sections. Such increases while highly desirable during off-peak periods would be just as highly undesirable during the peak periods.

The physical difficulties and cost involved in the collection of, and accounting for, zone fares has always been one of the strongest objections to them from the standpoint of the operating man. Mr. Witt presents a method in which all passengers make their exit past the conductor. Whether it could be applied to types of cars from which passengers leave the car from either end and could be conducted speedily, is hard to say.

The ideal fare should be just in a financial way to both the average rider and the railway. It should also be easily collected and accounted. These requirements seriously conflict. We have worried along with the old flat trip fare for years. Many of us are pretty well agreed that a change is necessary. The advocacy of short low-fare zones by Mr. Witt which prompted this discussion emphasizes the necessity of further study and experimentation in methods of fare collection with the zone system.

Why the Seven-Cent Fare Produced No Riots in Boston

IN VIEW of the long and acrimonious battle in Boston over fares, the calm way in which it was accepted on Aug. 1 points a moral. Thomas Dreier, of Boston, who has had a great deal of experience in electric railway matters, writes of the installation of the 7-cent fare as follows:

"A year ago there would have been riots in Boston if the management of the Elevated had suggested that 6-cent fares would be charged beginning on a certain definite day of the month. There was no excitement at all this year when it was announced that 7-cent fares would be charged. The people have just stepped up and paid their little 7 cents for tickets in strips of five, and there has been no excitement and apparently no kicking whatever.

"All this, mind you, in a congested community like Boston. The Boston Pippas are pretty well advanced."

How can one account for this phenomenon? It is simply because the public believes in the State officials. It believes that the service is going to get the benefit of the increased fare. It does not believe that the increase is going to be used for any peculiar or subterranean purposes.

This is the attitude of mind which must exist in any community before the electric railway company of that community can be successful. The case of the company must be laid before the public with such complete frankness and convincing sincerity that the people will have the same faith in the company and its purposes which they now have in their public officials.

This takes courage, and, truth to tell, courage is the quality which, in its dealings with the public, street railway companies have shown the least of. It also

takes faith and confidence; but the expression, on the part of the company, of these qualities—courage, faith and confidence—inevitably produces a reaction of the same qualities. Each then comes to a state of mind in which it can believe in the other.

"I Did Not Realize"—or "The Education of Mr. Pipp"

"THE education of Mr. Pipp" goes merrily on. Certain of the public officials are really beginning to appreciate that there are things in relation to the finances and operation of electric railway companies of which they have never dreamed in their philosophy.

For instance: The Cumberland County Power & Light Company of Portland, Maine, applied last February for an increase in its fare. A campaign for the governorship was about to begin. Instantly the political bees began to buzz. By direction of the Governor, who was a candidate for re-election, Attorney General Sturgis intervened "on behalf of the people."

Other politicians intervened "on behalf of the people." The weary weeks of obstruction dragged along. Spring passed by and summer came. But finally the Public Service Commission found for the street railway company.

Attorney General Sturgis in connection with this finding made a statement to the public. In it he said, in part:

"I did not realize that there should be taken into consideration a normal depreciation reserve charge.

"Other things, too, made me look at this matter from a different point of view. As, for example, I have learned that the company has had to pay an increase of \$65,000 in wages.

"We have found that it costs the company \$122,000 more now than it did to meet actual expenses. *They have a right to pay expenses.*"

Attorney General Sturgis has both honesty and courage. Many have one or the other, but the combination is rare.

In fact, some of the public officials are really beginning to realize that electric railway companies have a right to pay their expenses. The public had begun to suspect that even before the public officials did.

But the educational progress is by no means complete. In Buffalo, for instance, the Common Council recently passed a resolution in favor of a temporary 6-cent fare for the International Railway. It is to bridge over the emergency until the Public Service Commission can determine the rate for the full war period and six months thereafter. A referendum election is to be held on Aug. 20 to determine whether the commission shall be empowered by the city to establish the fare.

But, meanwhile, the councilors, quite aware of popular prejudices, inserted the following paragraph in the resolution which is to be voted upon:

Provided that no part of this fund (the added fare) shall be applied to the payment of any interest or dividend on any stock or obligations of either the International Railway Company or the International Traction Company.

In Massachusetts better headway is being made. On the first day of August, the Board of Trustees, appointed by the State, announced a 7-cent fare on the Boston Elevated (which includes all of the surface, subway and elevated lines). The trustees are operating this road under a law which provides for a return upon

the investment. The education of Mr. Pipp, in short, in Massachusetts has proceeded to a quite satisfactory point.

It might be a good idea if all the public officials could be assembled in one school so that numerous Mr. Pippes could be educated all at once. Better yet, perhaps, would be to put the various Mr. Pippes in charge of a street railway company.

What the Wage Award Means

YOU can't get blood out of a turnip," said President Mahon of the Amalgamated Association in a recent statement on the critical situation brought about by the appeal of union trainmen for a living wage. And promptly came the pronouncement of the War Labor Board that the employees of twenty-three companies must have their pound of flesh even though in giving it the employers may be bled to the last drop.

The award of the federal board which has had these cases under advisement for several weeks was referred to in last week's issue of this paper. It brings to the verge of bankruptcy more than one of the companies which will be required to comply with its terms. While the wage increases are retroactive in most cases and immediately effective in the others, there is no provision for prompt financial assistance with which to meet the added expenses. True, the chairmen of the board have recommended to the President that Congressional action be taken or that local authorities give relief with a view to saving these companies from disaster. The President has, however, already expressed his disinclination to interfere, and the companies are not at all cheered at the prospect of waiting on local bodies for aid.

Not alone in the fixing of minimum and maximum wages does the War Labor Board add to the financial burden of the companies. Perhaps the hardest blow aside from this—at least for many of the companies—is the shortening of the period required for the men to reach the maximum pay. Heretofore, this has been at least five years for the average company and ten or fifteen years in other cases. The Board has declared in all the cases before it that maximum pay is to be reached after one year's apprenticeship.

Time and again arbitrators in various parts of the country have held that a training period of five years or more was necessary to bring a conductor or motor-man to the point of highest efficiency warranting the maximum pay. Accident records of large railway companies have frequently been introduced to prove that new men are most costly to the management, and that there is justification in withholding the highest rate of pay until the fifth year or even later. Companies which have a considerable number of men in the intermediate classes of seniority will find this section of the award a costly one to comply with.

The unavoidable "spread of hours," which is peculiar to the street railway business, is also to prove a costly necessity for the companies under the ruling of the board. Under the operation of the nine-in-eleven-hours law, certain Massachusetts companies have been penalized for several years past for working the trainmen more than a spread of eleven hours. This has been

a hardship because of the difficulty of preparing timetables to meet the traveling needs of the public without having the "outside time" exceed the legal limit.

Few other companies have had to contend with such restrictions, although all operating officials with the welfare of employees at heart have insisted that their comfort be considered in every possible way when arranging schedules. The War Labor Board decision penalizes all runs with a spread of more than thirteen hours. Most companies have a large proportion of their runs within this limit at present, but to the extent that it is necessary to provide service by swing runs with a greater spread the service will be burdened with the extra cost.

Labor wins three other points of more or less value. Individual contracts are declared to be contrary to the principles of the board as constituting an interference with the free right of men to organize. The decision also protects "workers in the exercise of their right to join trade unions without fear of molestation by the employer." In the Columbus case the board also sustains the right of the men to wear the union button. While this last concession may appear trivial, it is a forceful weapon in the hands of organizers during the early days of unionizing a property, when intimidation is frequently attempted on men not wearing the union insignia. Individual contracts are in effect on various properties where the employees have rejected the attempts of Amalgamated organizers to alienate them. It has been contended in behalf of these employees that in signing such contracts they have exercised their own free right to prove their loyalty to the management rather than submit to the dictation of outside business agents.

While the board has evidently thought it necessary to appease labor so that disturbances shall be minimized during the war period, there appears to be an injustice in fixing of standard wages without due regard to other compensating features of certain contracts. In some cities the working conditions already call for payments of bonus for meal relief, reporting and settling up time and similar items. To the extent that these concessions are continued those employees will have an annual income higher than that prevailing in cities classed by the board as being in the same grade.

After all, the whole proposition turns on the ability of the companies to meet the situation before disaster overtakes them. There is no disputing the right of the men to a wage which will provide for health and comfort. The companies will pay that wage cheerfully if they have the means with which to do so. The railways must be kept in operation and must give good service, and one means for securing this is a contented group of employees. But still another essential is the financial integrity of the properties. Unless this is promptly assured, the award will be disastrous to the nation which needs good service. State bodies move slowly and the logical solution of the difficulty is federal action, such as the appointment of an electric railway administrator, which indeed has been asked by the National Association of Railway & Utility Commissioners. The men who have been benefited by the award should approve the plan of enabling the companies financially to pay the wages granted. We believe the public also is ready to sanction the plan of higher fares. It is a time for prompt and united action.



TYPICAL OVERHEAD CONSTRUCTION ON FILL—POWER COMPANY'S TRANSMISSION LINE AT LEFT

Quick Service Between Buffalo and Niagara Falls

High-Speed Line Is Now in Full Operation—Salient Features Are Catenary Construction with Heavy Overhead Bridges, a Long, High Fill to Obviate the Necessity for Numerous Grade Crossings and a Type of Car Especially Well Adapted to the Conditions

FOR several weeks full hourly service has been given over the high-speed line of the International Railway between Buffalo and Niagara Falls, N. Y. Many of the structural features of the line were covered in advance in the issue of the *ELECTRIC RAILWAY JOURNAL* for March 3, 1917, page 378. The completion of the job has permitted the taking of some pictures

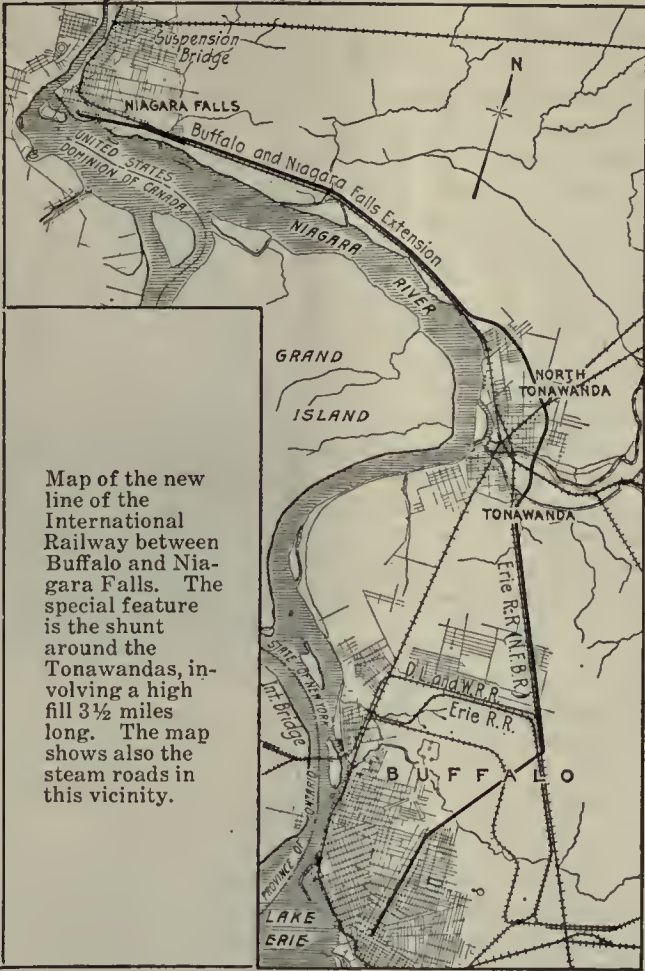
showing the construction better than could be done at that time. It was intended officially to open the line on Memorial Day of this year but this proved to be impracticable and it was actually opened some weeks later. The photographs of the completed construction were taken on May 31.

While most of the details of the design were taken



EXTERIOR AND INTERIOR OF CENTER ENTRANCE AND EXIT HIGH-SPEED-LINE CAR

up in the preceding article, some additional facts are now available and a brief general survey of the project seems appropriate. That this new line was needed is evident from the fact that the earlier line between the two cities, constructed in 1896, has become so congested with traffic that in the busy season a five-minute headway is necessary upon it. The time required for the through trip, also, is excessive. On the new line but one hour is required. The high-speed line follows the right-of-way of the Frontier Electric Railway, which is owned jointly and will be developed by the Pennsylvania Railroad and the Delaware, Lackawanna & Western Railroad. The route is shown on the accompanying map. The line is about 22½ miles long, three-quarters of it being upon private right-of-way. It connects Main Street, Buffalo, and Portage Road, Niagara Falls, passing en route through Tonawanda, North Tonawanda and La Salle. One of the outstanding features of the high-speed



line is the big Tonawanda fill. East of that city the line crosses two railroads, about 7000 ft. apart, and nine streets. It was out of the question, if safety and speed were to be secured, to cross the steam lines at grade and it was undesirable to cross the streets at grade for the same reason. To cross the steam lines overhead with the remainder of the line at the natural level would have involved several steep grades. It was finally decided to construct a fill 3½ miles long with a maximum depth of 26 ft. and containing 600,000 cu.yd. of material. Several of the illustrations for this article were taken on or near this fill. The necessary material was secured from a near-by hill involving but a short haul. The only incident marring this part of the job was a sudden settling at one point due to the presence of a quicksand which absorbed the fill and raised the ground surface cor-

respondingly. The track was laid on a sub-grade 29½ ft. wide with sides sloping 1½ to 1. On this 85-lb. rail was placed on standard-size white oak ties,



TYPICAL VIEWS OF TRACK BRIDGE CONSTRUCTION ON BUFFALO-NIAGARA FALLS HIGH-SPEED LINE

on 2-ft. centers. These were joined with Abbott plates, the joints being bonded with Ohio Brass No. 0000 compressed terminal bonds, with $\frac{1}{4}$ -in. terminals. When the fill thoroughly settles the track will be ballasted with crushed stone, but slag is being used temporarily. This fact accounts for the rather unfinished appearance of the ballast, noticeable in the pictures.

NEARLY 3000 TONS OF STEEL IN THE TRACK BRIDGES

The use of the fill increased the number of bridges necessary, a total of 2850 tons of steel being used in their construction. The largest single span is 184 ft. A group of pictures on page 227 shows the structural features of these bridges. At Tonawanda the through plate girder type was used, and over the Tonawanda Creek the bridge has five spans. Three of these are through girders, one is a truss and the fifth is a deck girder. This bridge may at some time be changed to a bascule drawbridge, and the plate and deck girders have been designed to provide for such a change with little difficulty.

It is interesting to note that in putting in the piers for the Tonawanda Creek bridge the deepest single-wall sheet piling used up to that time was a feature of the construction. The coffer-dam made of the Lackawanna Steel Company piling is shown in an accompanying illustration.

STANDARD BENT FOUNDATION UNITS ON THE BIG FILL

The overhead construction throughout involves the use of heavy bents and trusses, which were furnished and erected by the American Bridge Company. The design shown in the illustrations was standard as far as form is concerned but the weights of the members were varied to suit conditions. There were four of these weights, the lightest for use on tangent track, the heaviest for dead-end towers, and intermediate weights for curves and strain towers. All were built much heavier than necessary for the immediate purpose as it is possible that transmission line bonnets will be added later.

On level ground the usual concrete footings, four to a bent, were employed, but on the fill it was considered desirable to support the bents from solid ground. Hence, before the fill was made, concrete footings were molded in the ground and a structural-steel framework was carried up above the track level. To permit the use of standard units in the frames the concrete footings were varied in height. Two pictures are reproduced to show the footing construction, and in other pictures the method of attaching the bents to the foundation can be discerned.

In all 420 of the overhead bridge structures were installed, their total weight being 800 tons, or an average of 3800 lb. each. The standard spacing is 200 ft. with a minimum of 90 ft. on sharp curves.

TWO SOURCES OF POWER SUPPLY

The No. 0000 hard-drawn grooved contact wire is hung from a 500,000-circ.mil hard-drawn copper cable by loop hangers placed 10 ft. apart. The messenger is supported on most of the trusses on porcelain spools mounted on rolled steel shafts resting in iron socket bearings. This mounting provides for expansion and

contraction in the messenger and insures uniformity in tension. Pin-type insulators here and there act as messenger anchors.

The main source of power is the Niagara Falls Power Company which furnishes it, under a "firm power" contract, at 25 cycles and 11,000 volts. Supplementing



SUB-GRADE WITH TOWER FOOTINGS READY FOR TRACK AND OVERHEAD



OVERHEAD CURVE CONSTRUCTION, SHOWING PULL-OFFS
—FEEDER SWITCH ON BENT IN FOREGROUND



NEW SUBSTATION AT TWENTY-FOURTH STREET AND
ALLAN AVENUE, NIAGARA FALLS

this source is the famous old Niagara Street plant in Buffalo which has been remodeled for the purpose. A 5000-kw. steam turbine has been put in (see *ELECTRIC RAILWAY JOURNAL* for July 13, 1918, page 44), together with the necessary accessories. This turbine has now been in operation for several weeks.



FOUNDATIONS FOR STEEL BENTS,
TONAWANDA FILL



CLOSE-UP VIEW OF OVERHEAD SUSPENSION AND
STEADY SPAN ON BRIDGE



SHEET PILING COFFER-DAM FOR BRIDGE PIER,
TONAWANDA CREEK

The substation layout has also been considerably modified, including the addition of a new substation at Niagara Falls. The exterior of this is shown on page 228. The details of its design, together with those of the changes in the other substation, will be made the basis of a later article. Suffice it to say that the whole equipment has been selected to permit an increase at any time to 22,000 volts. Thirty-three thousand-volt GE-H-3 switches have been used throughout with this idea in view.

At Niagara Falls there are two new 1000-kw. G.E. rotary units and three old 400-kw. units removed from the former local substation. At Payne Avenue, Tonawanda, three 1000-kw. machines have replaced the same number of 400-kw. units, and at Fillmore Avenue, Buffalo, one 200-kw. machine has been put in, in place of a 400-kw. unit.

At Niagara Falls, by the way, oil-cooled transformers have been used in place of air-cooled ones, to obviate possible evil effects on insulation due to the fumes from the neighboring chemical factories.

The rolling stock for the high-speed line, most of which has been in operation on other parts of the system for some months, was fully described in the previous article referred to and in the issue of this paper for Jan. 6, 1917, page 61. The cars were furnished by the G. C. Kuhlman Car Company.

What Vehicular Obstruction Does at Seattle

AS OF JUNE 14, 1916, G. A. Richardson, general superintendent of railways Puget Sound Traction, Light & Power Company, prepared the following estimate of time lost on downtown streets due to vehicles obstructing street cars on week-days between 7 a.m. and 7 p.m. The average time lost during these hours is from two to three minutes per one-way trip.

Round Trip	7 a.m. 7 p.m.	Time Lost at	Time Lost at	Time Lost at
		Six Minutes per Round Trip, Minutes	Four Minutes per Round Trip, Minutes	Two Minutes per Round Trip, Minutes
Western Avenue.....	234	1,404	936	468
First Avenue.....	1,392	8,352	5,568	2,784
Second Avenue.....	1,268	7,608	5,072	2,536
Third Avenue.....	1,297	7,782	5,188	2,594
Total.....	4,191	25,146	16,764	8,382
Car time lost in hours.....		419	280	140
Passenger time lost in hours at twenty passengers per car.....		8,382	5,600	2,800
Trainmen's time lost at two men per car, in hours.....		838	560	280
Cost of trainmen's time lost at 40 cents per hour.....		\$335	\$224	\$112
Eliminating these delays will improve service on these streets with same number of cars in service, approx- imately.....		10%	7%	3 1/2%

The asphalt plant of the San Francisco-Oakland Terminal Railways enabled that company during 1917 to make asphalt at a price considerably below that quoted to the Oakland municipality. Thus the cost of binder on the job was 34 cents per cubic foot to the railway and 45 cents per cubic foot to the municipality.

A three-car train, the first ever operated on the division, ran between Detroit and Camp Custer on the Detroit, Jackson & Chicago Railway division of the Detroit (Mich.) United Railway on June 16 and proved immensely popular with a large number of Detroiters who visited the big military camp.

Automatic Rate System Is Fair to All

A Year's Experience with a Service-at-Cost Franchise in Westerville, Ohio, Shows Desirability of Flexible Fares Automatically Adjusted

By HAROLD W. CLAPP

General Superintendent, Columbus Railway, Power & Light Company, Columbus, Ohio

THE franchise of the Columbus Railway, Power & Light Company suburban line to Westerville, 13 miles from Columbus, is based upon the premises, first, that a community should say what it wants in the way of service, and second that it should pay for such service. An abstract of this franchise, which has been in operation about a year, was published in the *ELECTRIC RAILWAY JOURNAL*, of July 21, 1917, page 102. Briefly, the company is allowed under this franchise to earn 6 per cent upon the value of the investment fixed by arbitration, and 8 per cent upon new capital. The County Commissioners, acting through a street railway commissioner, have the right to prescribe conditions of service, and the company is in duty bound to provide the prescribed service.

FLEXIBLE FARE AUTOMATICALLY ADJUSTED

A sliding scale of rates of fare is provided, automatically adjusted with the fluctuations in the working capital, as was provided in the Tayler ordinance in Cleveland. In fact, the Westerville franchise is in general based upon the Tayler ordinance, which provides a most logical and workable mechanism for insuring a fair return upon the investment in electric railway properties with the exception that it imposes a fixed maximum fare. The recent law enacted by the Massachusetts Legislature, by the way, eliminates this weakness by always insuring four steps in the fare scale above or below the step established at any time.

In the case of Westerville, the sliding scale of fares is as follows:

-
- | | |
|-----|--|
| (a) | Four tickets for 10 cents, or 2½ cents fare. |
| (b) | Five tickets for 15 cents, or 3 cents fare. |
| (c) | Ten tickets for 25 cents, or 2½ cents fare. |
| (d) | Five tickets for 20 cents, or 4 cents fare. |
| (e) | Ten tickets for 45 cents, or 4½ cents fare. |
| (f) | Five tickets for 25 cents, or 5 cents fare. |
| (g) | Ten tickets for 55 cents, or 5½ cents fare. |
| (h) | Five tickets for 30 cents, or 6 cents fare. |
-

The cash fare is 5 cents a zone except under (f), (g) and (h), when it is 6 cents a zone.

Operation under the franchise began on Aug. 1, 1917, under schedule (d) with a ticket fare of 4 cents or five tickets for 20 cents. Soon afterward a commutation book was provided for six and seven-day regular riders, giving them two rides each week day or every day, as the case might be, at 3½ cents a zone. The only limitation on the use of this book was set by the dated tickets, each coupon bearing the date upon which it might be used.

The public control of the service on the Westerville line lies in a street railway commissioner, appointed by the body that originally granted the franchise, the County Commissioners. His salary is paid by the car riders of the Westerville line, as it is charged against

them in the operating costs.

The control of the service includes the right on the part of the street railway commissioner, acting for the public, to fix and alter car schedules, increase or diminish the service, propose extensions, betterments and permanent improvements, and approve or disapprove the same when proposed by the company. In short, he represents the car riders in all things affecting service and the cost thereof.

Operations under the Westerville franchise have been carried for more than a year. At the end of the eleventh month, which was June 30, 1918, the working capital had shrunk from \$25,000 to \$15,087.69. This would indicate that the rate of fare maintained was too low. It is altogether likely that by Sept. 1, at the very latest, with all accrued accounts adjusted, the working capital will have shrunk below the \$15,000 mark. At that time or thereafter as that fact can be officially determined from the reports of operation, the fare will automatically increase to the next higher rate, which in this case is 4½ cents per zone. Commutation rates will follow the upward trend and instead of being at the rate of 3½ cents per zone the tickets will be sold at the rate of 3½ cents per zone.

LOCAL STREET COMMISSIONER IS DOING HIS PART

During the past year John Scott, the street railway commissioner, has been constantly "on the job" of watching the service and making inquiries and suggestions. It must be remembered that this road is a small operation, as electric railways go, and that Mr. Scott as commissioner took hold of it at a time when it had been a going concern for twenty-five years. The possibilities for suggested changes are not so numerous as they would be on a more extensive transportation system. Nevertheless, Mr. Scott has found opportunity to serve the public most efficiently. He has taken particular pains on many occasions to go to Westerville, which is 13 miles from Columbus, and hold meetings and conferences with the city commission and with the Chamber of Commerce and with them go over the reports rendered him monthly by the company. These reports, by the way, show the financial results for the previous month; they are made in great detail to the commissioner by the 15th of the following month and follow the official classification as to form. A condensed statement from this report is printed on a bulletin and hung in a neat frame in the Westerville cars each month and also sent to the Columbus newspapers and to *Public Opinion*, the Westerville local newspaper. Publicity is the real watchword of such a plan of operation.

In the early part of the year the commissioner made special efforts to see how the newly-arranged zone

worked out so far as accommodation of car riders was concerned. He called for only one change during the year and that was in the case of a church located 600 ft. from the end of one zone, and he ordered the cars to change this zone limit on Sundays for the churchgoers only. The use of the line as a freight line by the merchants of Westerville would be greatly increased if a better located terminal for receiving freight could be had at the Columbus end. The company had been for a long time trying to find such a terminal but in vain. Mr. Scott has been striving to the same end. In many other minor ways Mr. Scott has made suggestions and inquiries. He is just at this time commencing the most important move for his car riders, in attempting to get the taxes assessed against the Westerville line reduced to a more equitable basis. The Westerville car riders are paying about \$9,000 a year taxes when in all fairness they ought to be paying about \$3,000. Mr. Scott has the county commissioners and the county attorney behind him in the fight that he is planning on this point.

Railway managers might as well face the fact that the time is here when the public ought to, and is going to, dictate electric railway service. The public is going to insist, in fact is insisting, upon saying when, how and where cars shall be run. I say, let the public do so if only it pays for the service.

There would be no trouble about this phase of it except for franchise restrictions on rates of fare. There's the rub! No progress is possible until the old contracts are voluntarily abrogated or rendered null and void by the rulings of commissions, when such bodies have rights superior to those of municipalities in this matter. Where municipalities alone have the right, they must act.

ZONE SYSTEM ONLY JUST PLAN FOR LARGE CITIES

Zone operation is necessary on a line like the Westerville line, but whether it is advisable in city operation must depend upon many local conditions. The shape of a city and the springing up of sub-business centers have more to do with this question than mere population. Real estate developments, usually allowed to locate without regard to anything except the profits of their promoters, often produce abnormal situations where the installation of the zone system is necessary. I have observed that when an American city gets above say 500,000 in population, the zone system is the only just one for both public and company. It is likely, in my judgment, to make headway in this country in the years immediately after the war, when it may be found that a much higher price level will exist than is popularly predicted now. The zone system will make it possible to place upon the shoulders of those getting the benefits the cost of operating lines that would be unprofitable as part of a flat-rate system.

But whether a flat rate or a zone is used, the fare ought to be flexible or follow a sliding scale. The time has gone by when cities or companies are going to get each other by the throat with a fixed fare. Any community is interested in service first—what it shall be and how it shall be rendered. The public is also learning that it is interested, for selfish reasons, in the ability of its electric railway to provide that service, and to grow not only with the town itself but also with

changing methods of conducting transportation. It begins to be apparent to both sides that the price of service cannot be, safely for either side, fixed for a term of years.

The provision for a sliding scale in Westerville takes care of fluctuating costs, downward as well as upward. It is done in this way: A total of \$25,000 of the capital of the line was in cash and was termed the "working capital fund." All the surplus at the end of each month, after paying operating costs, maintenance, taxes and interest at 6 per cent on the capital invested (\$300,000 in this case) is paid into this fund. When the working capital fund increases to \$35,000, the next lower rate on the schedule may be ordered into effect by the street railway commissioner; when it shrinks to \$15,000, the next higher fare may be installed by the company.

GET AN AUTOMATIC SYSTEM NOW

The whole matter of fares is complicated at present by the fact that many of the electric railways do not appear to know what they want in the way of a permanent settlement. One company asks for an increase of 1 cent, and another for 2 cents. A third wants a charge for transfers, and a fourth prefers the zone system. It is understood in all cases of appeal for emergency relief that any relief given now will be temporary if operating conditions continue to become more and more strenuous. Obviously as wage increases are constantly demanded, as material prices mount skyward, as interest rates go up, there must come a time when another increase of fare will be asked for. On the other hand, it is conceivable that prices might go down, leaving the rate of fare too high. Then the public must go through a process the reverse of that instituted by the companies when they appealed for higher fares.

In other words, under the present general plan there will be a seesawing up and down, with somebody always appealing for something. Why not take the bull by the horns and throw him—that is, make now the effort necessary to institute an automatic system, fair to everybody, and dispense with all this appealing, which is a constant source of irritation?

If this plan is followed it may, in many cases, be necessary for holders of stock to consent to a considerable reduction in its volume. It is better, however, to have less stock of a marketable and dividend-earning character than the greatly depreciated, sluggish stock which characterize so many properties and which a man would be called a fool for buying. In Cleveland, where the stock total was cut, the stock is now owned by many times as many stockholders as formerly, and it is a gilt-edged investment.

The only way out, in my opinion, is a service-at-cost system. This plan removes the veil of mystery from the finance and the operation of a public utility. The community immediately realizes that the utility stock is a safe investment because the community has in effect guaranteed the security. Being aroused to an interest in its public utility, the community thereafter invests its savings in it, and the final step is a long move toward co-operative ownership and a boosting instead of a knocking community.

Is this not what the management of public utilities should be trying to secure?

Meeting the Nation's Transportation Needs

Some Details of the Ways in Which the Extra Transportation Burdens of War Days Are Being Carried by Florida, Georgia, Texas and Washington Railways

THE past year has been a strenuous one for electric railways situated in the vicinity of cantonments, war manufacturing plants, shipyards and other seats of abnormal activity and greatly augmented concentration of population. Nevertheless, in spite of money and man shortage the demands of the hour have been met, partly with federal aid. The situation in a number of centers has been taken up in recent issues of the ELECTRIC RAILWAY JOURNAL. This week the series of articles is continued with accounts of electric railway expansion and adaptation at cities as widely separated as Jacksonville, Fla., and Tacoma, Wash., and at some points between.

Serving Soldiers and Shipyards at Jacksonville

Company Has Built 3-Mile Extension to Camp Johnston and May Add 1½ Miles—Man Shortage Is a Problem

AS THE result of war activities, the population of Jacksonville, Fla., and vicinity has increased from 80,000 to 100,000 or more. This has not made it necessary, however, for the Jacksonville Traction Company to purchase new cars, for the business to-day has simply gone back to where it was before the depression of 1914. Except in the case of Camp Joseph E. Johnston, the company has not needed to build new track and give special-service.

\$160,000 TO PROVIDE TRANSPORTATION FOR 20,000 AT THE GREAT QUARTERMASTERS' CAMP

The big problem of the company to date has been to take care of Camp Joseph E. Johnston, the great Quartermasters' camp of the country where thousands of men are trained for work from shoeing horses to writing shorthand. This camp is 10 miles from the heart of Jacksonville. Its personnel runs as high as 20,000. As in the case of other cantonments, the travel is spasmodic and variable in amount.

The nearest line which the company had for serving the camp was the Ortega line. This was extended 3 miles and opened for service on April 15. To do this, any rail that came to hand had to be used, from 56 lb. T to 122 lb. girder. The latter, of course, will be replaced with T-rail and used in the city when times have changed for the better.

Even with this extension, the railway does not go through the camp. It merely reaches the entrance, at which point government-controlled autobuses carry people through the grounds. The fare on the street cars is 15 cents; on the buses, 10 cents. The government is now urging the company to extend its line another 1½ miles in order to serve the entire camp for the same 15-cent fare.

This fare is charged any passenger who boards the

camp cars. These are distinctly marked as giving through express service to Camp Johnston for a 15-cent fare. The condition is a peculiar one, because up to the end of the old Ortega line the fare is only 5 cents. The restriction is necessary, however, to separate effectively the local rider from the through passenger.

FACILITIES FOR TEN-MINUTE SERVICE

Although the extension is single track for unit-car operation, every curve is double-tracked and there are six passing tracks within the 3-mile distance. If necessary, therefore, a ten-minute service could be given. At present a thirty-minute service is run between 5 a.m. and 12 o'clock midnight, except that four outbound cars to camp are added between 5 a.m. and 6 a.m., and four inbound cars between 5 p.m. and 6 p.m. To avoid dead mileage, these four cars stay at the camp all day while the crews are at work elsewhere or on leave.

The camp has no prepayment area, but from 4 p.m. to 7 p.m. a man is stationed at the terminal to sell tickets in advance at 15 cents straight. In this way, the loading is greatly facilitated, as making change for a 15-cent fare is painfully slow. To assist the company in the safe and orderly loading of cars, the government also furnishes a platform guard who is relieved by a second soldier about 3.30 p.m.

Owing to the low voltage, the 10-mile trip now requires an hour instead of forty-five minutes. Soon there will be in operation, however, a 500-kw. Westinghouse motor-generator placed in a corrugated shed, 1 mile from the terminal. This will raise the voltage sufficiently to permit the run to be made in forty-five minutes, or in one hour if the 1½-mile extension through the camp is built. The total cost of the substation and of the 3-mile extension already built will be about \$160,000.

While the company has not had to buy any cars, it is changing some open cars for one-way operation by the simple expedient of cutting off one running board and screening the side so that it will be impossible for passengers to jump off.

MUCH SHIPBUILDING UNDER WAY

Most of the shipyard work at Jacksonville is on the opposite shore of the St. John's River. The employees from the yards go *via* ferry to Jacksonville, where they board cars for various lines. The largest single shipbuilding enterprise is that of the Merrill-Stevens Company, which has six 6000-ton and four 10,000-ton steel vessels on the ways. Another of the five Jacksonville plants has twelve ways for wooden ships, and it is building three 5000-ton vessels. Still another plant is building submarine chasers. A big project on the Jacksonville side of the river is that of the Marine Railway & Drydock Company, to be operated

by the Emergency Fleet Corporation in connection with a private shipbuilding plant.

In all from 6000 to 8000 men are employed in shipbuilding at present, although the Marine Railway & Drydock Company alone expects to employ at least 5000 men eventually. Its site, if thus built up, would call for a $\frac{1}{2}$ -mile extension. Housing has not yet presented any problem. One reason is that from 5000 to 6000 negro laborers were taken out of Jacksonville last year.

TRYING TO MEET THE MAN SHORTAGE

Like so many other electric railways, the Jacksonville Traction Company finds it hard to compete with the tremendous wages paid by the shipyards and other war industries. Matters actually reached the point where the employment agent of the shipbuilders promised to take no more railway men, for he realized that this would simply hurt shipbuilding interests more than it would aid them.

Since America's participation in the war, the company has raised wages three times. It is also saving

New Five-Mile Savannah Line

Extension to Government Shipyards Is Well Under Construction—Ten Open-Bench Cars Are Being Inclosed

THE county of Chatham (Savannah) has planned a concrete road about 5 miles long, with an electric railway extension, to open up an immediate approach to the yards of the Foundation Company, now in course of erection on grounds almost contiguous to Savannah, and also to the yards of the Terry Shipbuilding Corporation at Port Wentworth, 8 miles out. The accompanying map shows the route. The new facilities would also serve intermediate interests, such as the Savannah Warehouse & Compress Company, Savannah Sugar Refinery, Globe Machinery & Barrel Factory and the Atlantic Paper & Pulp Company.

For a time the work was held up through delay on the part of the owners of the Whitehall plantation in granting a right-of-way, but recently the Emergency Fleet Corporation secured the necessary land. Now the



NEW FIVE-MILE CONCRETE ROAD AND EXTENSION OF SAVANNAH ELECTRIC RAILWAY TO SHIPYARDS

large sums of money for its men by selling groceries to them at cost. The business amounts to \$3,000 a month for 350 men. This policy is carried to the point of competing with the credit grocer, for if the railway man lacks the cash he can get a \$5 coupon book, provided he has an equivalent amount of cash coming to him.

The salesroom adjoins the carhouse. It has no running charges of importance except \$50 a month for the boy in charge. The service originally included delivery, but this was found too costly. All business is now done over the counter, either with the men themselves or with their families.

Because of the shortage of men, however, the company recently published an advertisement for four weeks in seven county papers. This has brought in country boys, some of whom are only seventeen years of age. In fact, war conditions have also forced the company to engage men over fifty years of age. It is not improbable that women will be tried this autumn. If so, they will be put on lines in high-grade residential districts.

Savannah Electric Company is building the single-track (eventually a double-track) line which it has a right to lay on the left-hand side of the road for a width of 25 ft. The subgrading is now 50 per cent to 75 per cent completed for the remainder of the distance, and the steel laying is practically finished.

At present transportation to the Terry assembling plant is effected by a Savannah & Northwestern steam train, by boats and by automobiles—all of which have proved to be insufficient, roundabout and expensive. The Terry people have stated that with regular electric transportation, for which the fare would be 10 cents, the yards would be able to attract from 15 to 40 per cent more men. The Savannah Electric Company would give a twenty-minute headway during rush-hour operation, with a forty-minute headway in off-peak service. In order to be ready to give this service it is inclosing ten forty-passenger open-bench cars, and it is installing a substation.

At this time the railway is serving morning and night only 2000 employees of the Foundation Company, which is building thirty-six steel mine sweepers. The

Foundation Company has installed at its own expense a 1-mile spur so that its men can have direct service with a minimum of walking. The fare is 10 cents, although a mile walk reaches the present Mill-Harper line and a 5-cent fare limit.

Traffic Up 50 per Cent at San Antonio

Five-Mile Extension, Thirty New Motor Cars and Fifty-four Home-Made Trailers Added to Handle War Business

THE pre-war population at San Antonio, Tex., was 130,000. Now a harried postmaster asserts that 300,000 people are addressed *via* the City of the Alamo. Be that as it may, about 80,000 men have been added through Kelly Field (America's greatest aviation school), Brooks Field, Balloon School, Camp Travis and Fort Sam Houston. In addition the city now holds the dependents of many of these men and a large number of Mexican refugees. The general increase in population has resulted in a 50 to 60 per cent gain in traffic. For the twelve months ended April 30, 1918, the San Antonio Public Service Company carried more than 37,000,000 passengers.

The company faced a serious problem in providing for this increased traffic. Operating expenses have been going up enormously, fuel has more than doubled in cost, and the cost of other supplies, when obtainable, has increased in an even greater ratio. New equipment practically could not be procured, both because of war conditions and because of the lack of money to purchase it.

HANDLING THE INCREASED TRAFFIC

A year ago the company was operating eighty-two motor cars and no trailers; to-day it is operating 100 motor cars and as many as fifty-four trailers. In view of the impossibility of getting new cars quickly, the company was fortunate in having received thirty new motor cars just before the rush began.

The entire track system of the company has been rehabilitated and extended, the last of the work having just been completed. In order to provide adequate service to Kelly Field about 5 miles of new track had to be built.

The increased business is handled during rush hours by trailers on the Hot Wells, Kelly Field and Army Post lines; and by trippers on the other lines. The charge for service is 5 cents. A 5-cent bus line, however, giving a ride up to two miles, connects with the electric railway at Fort Sam Houston in order to give service to Fort Travis. Army traffic is extremely difficult and expensive to handle, as heavy peaks occur at uncertain times.

The Army Post line of the company, covering Fort Sam Houston and Camp Travis, has seven and one-half and five-minute headways, while the West End-Alamo Heights line service serves the same district in part with fifteen and ten-minute headways. The Hot Wells line to Brook Field has ten and five-minute headways and the South San Antonio line has a twenty-minute all-day headway which is changed when special conditions require.

As has been found by other electric railways to be the case, it is difficult in these days to hold the men even by wage increases. The wages in San Antonio were increased 5 cents an hour on April 1. Men for tripper service are taken from the extra list.

THIRTY MOTOR CARS WITH NON-PARALLEL AXLES AND 12-FT. WHEELBASE

The thirty motor cars which have been in use since the spring of 1917 have car bodies 22 ft. 3 in. long, 34 ft. 3 in. over the dashers and 35 ft. 3 in. over the bumpers. One of the most notable features is the use of non-parallel axle trucks. Fifteen of the cars are on Brill "Radiax" trucks and fifteen on St. Louis trucks with non-parallel axles, the wheelbase in both cases being 12 ft.

Fully equipped, these cars weigh 22,600 lb. for thirty-six seated passengers, or only 626 lb. per seat. The



TWO-CAR TRAIN OPERATION DOWNTOWN IN SAN ANTONIO



AT LEFT, ONE OF THE LATEST MOTOR CARS IN OPERATION IN SAN ANTONIO; AT RIGHT, LOADING SOLDIERS IN SAN ANTONIO

construction, except part of the superstructure, is of steel. Half the cars were built by the American Car Company and half by the St. Louis Car Company. The equipment includes Westinghouse 512 C motors, K-36 J control and Westinghouse M-W I airbrakes.

FIFTY-FOUR HOME-MADE TRAILERS WERE PRESSED INTO SERVICE

In order to meet the traffic demands, the company resorted to the use of trailers during the rush hours. Twenty-four of the trailers were old trail cars. These were reversed for front instead of rear entrance, so that as in the case of the other trailers passenger movement will be concentrated at two adjacent entrances. The other thirty trailers were built up from the substructure of work cars. The wheelbases of the original Bemis 6A trucks were extended from 6 ft. 6 in. and 6 ft. 7 in. to a uniform spacing of 8 ft. The 33-in. wheels were replaced by 24-in. wheels, so that the vestibule is flush with the body floor. The bodies were built of wood, with an arch roof covered with No. 8 duck.

A two-leaf folding door at the front provided for entrance and exit. The windows were not glazed but were protected against the weather by awning material. Longitudinal wooden seats were used, but if desired these could readily be changed to transverse seats. Instead of straps, a horizontal pipe, a convenient height and stiffened by vertical stanchions, was installed the length of the car. Signal buzzers for the passenger were also provided.

7000 Camp Gordonites Are Handled Daily

To Reach This Camp, 12 Miles North of Atlanta,
the Local Company Has Built a 4-Mile
Extension—15-Cent Fare Is Charged

ONE of the great cantonments of the south is Camp Gordon, which is located 12 miles north of Atlanta, Ga. The number of soldiers at the camp has been as high as 30,000, and civilians have total.d about 800. Ordinarily, the Georgia Railway & Power Company gives to the camps a service with ten cars under a twenty-minute headway, but during the rush periods on Wednesdays, Saturdays and Sundays it operates as many as forty-five cars.

The travel is largely of the twice-a-day kind. The inbound morning travel from regular riders is largest when the outbound camp travel is at its height, and *vice versa*. Cantonment employees come at 6.30 a.m. and leave with a rush at 5 p.m. About 7000 passengers are handled daily.

The line to the camp is an extension of the Bulkhead 10-cent suburban line. When the route was extended another 4 miles the fare for the full ride became 15 cents. The fare, however, is paid according to the number of zones instead of the maximum being imposed at one time. In this way ordinary passengers to the intermediate 2-mile zone are not kept off the camp cars, for their travel is not enough to justify a separate service.

The extension, which comprises 5.36 miles of single track, was financed by the company at a cost of \$225,000. The 90-lb. T-rails were purchased from a broker, while most of the other supplies except ties came out of the stock which the company had purchased for work later deferred.

SUBSTATION EQUIPMENT AND CARS NEEDED TRANSFERRED FROM OTHER LINES

Two substations were erected to handle the camp load, one containing two 500-kw. rotaries and the other one 2000-kw. rotary. These machines were taken out of other stations.

The cars in use have been taken from other lines. They are of various types, seating from twenty-eight to fifty-six passengers. Single trailers are attached as needed. The company was unable to secure suitable second-hand cars, and it is therefore converting to closed trailers some cars which were open above the belt rail. Twelve trailers, seating forty each, are also being built for camp or other suburban service. These cars will have steel underframes and steel sides, and will weigh 20,500 lb. each. All of the trailers will be fitted with Hale & Kilburn slat seats of the Walkover type.

Besides five multiple-unit cars now in use, twelve motor cars are being fitted with Westinghouse HLD control. The original Westinghouse 68-C motors are being retained. The Brill 22-C maximum traction trucks, however, are being altered to take swinging bolsters. These cars also seat forty, and they weigh 26,000 lb. each.

Tacoma Uses Zone Fares to Shipyards

Municipal Railway Sells Tickets for 6 Cents and 7½ Cents Over Extensions to Industries on the Tideflats—8000 Shipbuilders Handled

TACOMA, WASH., is doing its share and more to carry Uncle Sam's men and Uncle Sam's wares. Within less than a year there has sprung from an insignificant beginning a force of 8000 shipworkers employed by six shipbuilders.

The great bulk of Tacoma's war development lies in a filled-in and recently enlarged section known as the Tideflats. Tacoma proper is built on the sides of steep hills and does not offer much space for docks and shipways. The Tideflats district is purely industrial, so that travel to and fro at any time of the day except when working shifts change is very small. Obviously, this is not the kind of traffic which most railways are seeking, especially when it comes as the extension of a 5-cent ride already exceedingly liberal. This fact was recognized by the city when the industrial devel-

the center of the business district through the industrial district on the Tideflats to the city limits, a distance of 1½ miles, with two extensions beyond the city limits. One of these is 1½ miles in length and the other 1½ miles. A passenger not provided with tickets pays an extra 5 cents for a ride beyond the city limits. By the purchase of tickets, however, a passenger from the center of the city can ride to the end of the shorter extension for 6 cents and to that of the longer extension for 7½ cents. Tickets for rides solely outside the city limits are provided for 1 cent and 1½ cents respectively. All the tickets are sold in books of twenty each.

Transfers are exchanged between the municipal line and the line of the Tacoma Railway & Power Company. The city redeems its transfers from the company for 3 cents each, while the company pays only 2 cents to get back its transfers. The company operates the municipal line under a two-year contract which began on Nov. 1, 1917, with equipment and facilities furnished by the city. The city is billed at cost for the expenses of operation, and it assumes all liabilities for accidents on its track.



NOT EVERYONE OF TACOMA SHIPBUILDERS DEIGNS TO RIDE HOME IN ELECTRIC CARS



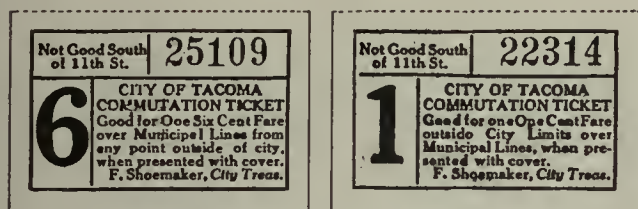
AT LEFT, A LINE-UP OF TACOMA'S SHIPWORKERS READY FOR THE DAY'S PLEASURABLE TASK. AT RIGHT, UNLOADING THE SHIPWORKERS FROM THE MUNICIPAL TIDEFLATS LINE FOR TRANSFER TO THE TACOMA RAILWAY & POWER COMPANY LINES AT ELEVENTH AND A STREETS

opment began, and it solved the problem by constructing its own line to the Tideflats. Owing to its straitened finances, however, the city has asked the Emergency Fleet Corporation to help complete the double tracking which is imperative to insure satisfactory service even now.

The regular rate of fare in Tacoma is 5 cents to any point inside the city limits on the lines of both the Tacoma Railway & Power Company and the Tacoma Municipal Railway. The municipal line extends from

At present the Municipal Railway is equipped with such second-hand cars as could be purchased, including four closed cars, ten open cars, one locomotive, four trailers and ten closed single-end cars just bought from the Twin City Rapid Transit Company. The ultimate plan is to use multiple-unit trains of three and four cars each for the rush periods and smaller units during the light-traffic periods. The line has loops at both ends so that single-end cars or single-end-control trains can be operated satisfactorily.

Considerable congestion exists in the Tideflats district at the end of the working day, but an effort has recently been made to reduce this by staggering the hours. Another difficulty has come from shortage of labor, for more than one-third of the former employees of the



TICKETS USED ON TACOMA MUNICIPAL LINE

Tacoma Railway & Power Company have gone into the shipyards.

The Municipal Railway handles all the freight outside the city limits going to the several industries on its line, and it collects \$5 a car for switching. This freight business has proved most profitable and is increasing as each additional industry is started in this district.

A Cantonment Almost Within City Limits

Camp Bowie's Presence Has Brought An Increase In Travel to Fort Worth of From Thirty to Forty Per Cent

NOT 3 miles from the center of Fort Worth is Camp Bowie, located on the Arlington Heights line of the Northern Texas Traction Company. This cantonment has had more than 28,000 men, the number varying from week to week as the men come and go. The presence of this camp has stimulated riding on practically all of the city lines by 30 to 40 per cent.

As for the Arlington line itself, the last 2 miles of route have been double-tracked. While the service to the end of the line is given under a fifteen-minute headway, the camp normally has a 10-minute headway, with any desired increase in emergencies. At present the motor-trailer combination in use have to operate to the loop at the end of the line, 5.2 miles out, but cars will soon be turned back at the camp.

To meet the needs of the Arlington line, ten open cars were leased from the Dallas Railway. Five single-truck and six double-truck trailers were leased from the El Paso Electric Company, and three cars from the Galveston Electric Company. Six closed-car bodies were bought from the East St. Louis & Suburban Railway, and were equipped in Fort Worth, and six trailers were bought from Colorado Springs.

There are also three aviation camps near Fort Worth: Hicks, 15 miles to the north on the Fort Worth & Denver Railway; Benbrook, 9 miles to the west on the Texas & Pacific Railway, and Everman, 12 miles south on the Cleburne interurban line of the Tarrant County Traction Company. The last camp is the only one reached by electric railway. Connection to the camp is made at Aviation Junction, from which a spur 0.8 mile long runs to the camp. The track for the spur was built by the International & Great Northern Railway, but the poles and wire were furnished by the electric railway. A shuttle car running between the camp and the junction takes care of all aviation camp traffic.

One-Cent Zones Advocated

Peter Witt Urges the Merits of the Zone System of Fare Collection But Thinks that Zone Fares Should Be One Cent

"WERE our street railways on a competitive basis they would have been driven to adopt the zone system long ago. Now the pressure of war-time operating costs has made the zone system practically inevitable."

These opinions were recently expressed to a newspaper man in Cleveland by Peter Witt of Cleveland, former traction commissioner of that city. Mr. Witt then explained that by the zone system he meant "putting the fare on a mileage basis" and not a 5-cent or 6-cent interior zone with exterior 2-cent or 3-cent zones. He believes in the 1-cent zone with adjustments of length of zone to suit the traffic and income. According to Mr. Witt the low zone rate would greatly encourage off-peak riding as well as short-haul riding. Thus on the Euclid Avenue line in Cleveland, where all lines loop at the Public Square, he would establish the 1-cent zone boundary at Fourteenth Street, fourteen blocks from the square. This is the boundary of the most crowded shopping and business district, and as cars come from town people begin to get off there. Continuing, Mr. Witt said, in part:

ONE-CENT RATE WOULD INCREASE TRAFFIC

"If there were a 1-cent rate for passengers boarding and leaving within the zone, the company would get for every car many passengers who now, rather than pay a nickel, will walk. The company would be increasing its net income, and the long-haul passengers would not be compelled to pay any different fare from that which they will pay anyhow under the necessity of the companies to raise their unit rate to 6, 7 or even 8 cents.

"With cars going out from the Square, the conditions would be the same. The car does not get its full load before it reaches Fourteenth Street. All along the route there are a certain number of short-haul passengers. Thoughtful study of the situation and careful experiment will determine what zone arrangement will produce the maximum revenue.

"Night and morning the cars run crowded into or out of the central zone. But these are the very hours when potential traffic wholly within the zone is comparatively light. On the other hand, all through the middle of the day the downtown district is jammed with thousands of people—not only women shoppers, but business men and transients—who would patronize the cars at a 1-cent rate per zone and who now will not pay a nickel or 6 cents for a ride only one-tenth as long as the ride to the end of the line which they could have for the same rate. Anybody who has studied the currents of women shoppers through the streets will agree on the increase of business which they alone, trained nickel-savers as they are, would give to the cars at a penny fare per zone.

"More than this, I would divide each zone in half, making thus two sub-zones. A passenger boarding a car in the last half of the one zone should be able to ride into the first half of the following zone for 1 cent instead of having to pay 2 cents as he would under a rigid zone system.

"Each passenger when he enters the car would receive an identification slip. It would be lettered and numbered to indicate the point where he boards the car. Thus, a slip numbered 1-A would indicate that the bearer boarded the car in the first half of the first zone. Slip 1-B would indicate the second half of the first zone. At the point where he left the car the passenger would deliver his identification check to the conductor and it would be easy to determine instantly the rate of fare he must pay.

"With modern front-entrance pay-as-you-leave cars, the process would be still simpler in that the motorman who is unoccupied while the car is stopped could deliver the identification slips to the entering passengers while the conductor was busy collecting fares from alighting passengers.

"Take a car running on a 10-mile line and costing 30 cents per mile to operate. Its operating cost is \$3 every trip. It must carry sixty passengers every trip just to meet expenses alone. No car on such a line carries that number every trip. But under the zone system, without losing any of its long-haul riders, and without losing the money which they now pay at the 5-cent fare or the higher fare which is bound to come, that same car would increase its revenue considerably on the short-haul riders. In the rush hours these cars under the present system make up their losses in the off-hours. Under the zone system they would still make their big rush-hour revenue and they would build up their off-hour revenue as well.

ZONE SYSTEM NOT CAUSE OF CONGESTION

One objection which has been advanced to the zone system is that it produces congestion in housing conditions in the center of the city. In other words, the policy of the uniform fare is said to be to tax the short-haul rider in order that poor people may live in the suburbs and get to work cheaply. But that is not the way it works out. As soon as you give cheaper-than-cost fare to an outlying district, realty values jump in that district, and the landowner absorbs the benefit which was intended for the poor man. We have never had anything but a unit rate of fare in this country, yet it has not prevented congestion. Crowded slum districts still center in the very region from which you would like to eradicate them. As it works out, the poor man lives well within the city limits, and himself is the short-haul rider. He pays the tax. And the comparatively well-to-do man lives in the suburbs, profiting by the cheaper-than-cost fare. The very family you pretend to help by the unit fare is the one you in fact penalize.

"The problem of congestion is a grave one. But it cannot be solved by a flat rate of fare on our car lines. Other conditions cause it, including fundamentally the land question, and it must be solved by changing those conditions—not by attempting to palliate them with the profitless and inefficient system of a flat unit rate of fare.

WILL PROTECT AGAINST JITNEYS

"Competition by the jitneys is still another factor which is going to render the 6 or 7-cent rate of fare ineffectual. The higher the fare goes, the more people will be driven to make use of other forms of transporta-

tion for short hauls. 'We can't compete with the jitneys,' cry the street railway companies. Therefore they have tried to legislate them out of existence. It can't be done. But the plain fact is that the street railway companies can compete with the jitneys, if they would only wake up to the zone system. You cannot carry people as cheaply on rubber tires as you can on steel rails. You cannot carry them as comfortably that way, either. Only you must meet the jitney price and beat it. By the zone system that can be done. The jitney only takes the short-haul traffic. At a moderate fare per zone you can not only grab all of the passengers away from the jitneys, but kill the jitneys as well—as they should be killed. Competition with a natural monopoly is an economic waste which the riders in the end must pay for.

"The zone system is therefore fair, feasible, effective. It will give the greatest revenue and the best service. And it will give the public the cheapest fare per mile compatible with good service. The zone system must come if we are to save the street railways from collapse. But it must be a system such as I have outlined here and not the anomaly of a 5 or 6-cent inner zone and a 2 or 3-cent outer zone which most companies now contemplate."

Durable Benches for Outdoor Service

THE Southern Pacific system has adopted a simple and durable form of bench for outdoor service in the West that is used on both steam and electric railways. The design is varied somewhat but, in general, consists of two concrete standards used to support two 2-in. x 12-in. planks, one serving as seat and the other as back rest, as shown in the illustration.

These benches can be assembled in the shop or along



DURABLE BENCHES WITH CONCRETE STANDARDS USED BY SOUTHERN PACIFIC SYSTEM

the line, whichever is most convenient, the only tools required for assembly being a chisel to fit off-size wedges or holes and a hammer to drive the pieces together properly.

The seat and back planks are held in place by wedges driven through holes just outside the concrete standards, four wedges being used to each plank. The concrete standards are made about 4 in. thick. The fact that the benches are rather heavy is an advantage in that they are not easily overturned and are not likely to be carried away.



FRONT END OF CARHOUSE AFTER THE FIRE. THE SUBSTATION WHERE THE FIRE STARTED IS LOCATED ON THE EXTREME RIGHT

Some Lessons from a Disastrous Carhouse Fire

The Carhouse and Fine Interurban Cars of Bamberger Electric Railway Were Recently Destroyed and Service Was Badly Crippled for Time

A FIRE on May 7 in the carhouse of the Bamberger Electric Railway at Ogden, Utah, destroyed one 40-ton electric locomotive, ten 56-ft. motor cars, four 56-ft. closed trailers and six 61-ft. open excursion trailers. These latter were nearly new, having been in service but slightly more than a year.

The fire started from an explosion in one of the tanks of a 44,000-volt lightning arrester in a substation located at one side of the carhouse. The explosion broke a large window between the substation and the carhouse and the burning oil from the lightning arrester scattered over the first row of cars and the roof of the carhouse. All of these immediately caught fire and this was rapidly communicated to other rows of cars and to the roof of an adjoining carhouse. The d.c. system grounded immediately after the explosion, cutting off all power for moving the equipment from the burning building. Of the company's fine interurban equipment

nothing was left but trucks and charred underframes.

This fire serves to illustrate the soundness of the recommendations made by the committee on buildings and structures and the committee on equipment of the American Electric Railway Engineering Association, incorporated in the 1915 Proceedings. These recommendations for proper construction in order to prevent excessive damage from fires were worked out in conjunction with the National Board of Fire Underwriters.

Some of these recommendations may be properly referred to in connection with this fire. A paragraph on lightning arresters states "If the voltage of the circuit is in excess of 6600 a special fireproof room, compartment or building shall be provided to contain such arresters." Further recommendations provide that windows and skylights must be provided with wired glass and standard metal frames. The roof construction must be of non-combustible material and have non-combust-



AT LEFT, A CLOSE-UP VIEW SHOWING HOW THE SUPERSTRUCTURE OF THE CARS WAS COMPLETELY DESTROYED; AT RIGHT, LOOKING DOWN ON THE REMAINS OF THE CARHOUSE AND EQUIPMENT

ible coverings of approved composition. The feeder system for each compartment of the carhouse must have an individual circuit breaker at the entrance so that, in case of a ground on one section, the circuit breaker controlling this section can be opened and power still be made available for removing cars in other sections.

The best construction provides that there shall be no inter-communicating windows between adjacent buildings. The wall between the substation and this carhouse should thus have been without windows and, in case openings were necessary, these should have been equipped with standard fireproof doors. Another method for providing necessary protection is to provide a cut-off wall between substation and the carhouse. This should be a blank wall without openings constructed of brick, stone or reinforced concrete and rising not less than 2 ft. above the roof.



AN INTERIOR VIEW SHOWING THE RESULTING DAMAGE TO ONE OF THE OPEN EXCURSION TRAILERS

At the time of this fire a hand sprinkler system was in the course of construction but was not yet in operating condition. Such a sprinkling system is not favored by the Board of Fire Underwriters, which recommends that all sprinkling systems must be automatic. Any hand system necessitates the entering of the building and turning on the cocks in case of emergency, and often the fire and smoke will prevent efficient use of such a system.

In order to maintain its service the Bamberger Electric Railroad leased temporarily some steam railroad coaches. A new concrete carhouse with arrangements for future shop extensions is in contemplation, and though definite location has not yet been decided upon, it will no doubt be at Salt Lake City, where the general offices of the company are located.

The accompanying illustrations give a clear idea of the extent of the damage and the present condition of the carhouse and equipment immediately after the fire.

A novel feature of the wooden car loading platforms at Winnipeg is that they are built and maintained by the city. They have proved a great convenience to the public, particularly as protection against vehicular traffic.

Maintenance of Car Equipment*

The Author Describes the Procedure Which He Has Found Most Effective in Making Running Repairs and in Overhauling Cars Periodically

By JESSE M. YOUNT

Master Mechanic, United Railroads of San Francisco

THE passenger of a street railway, when he pays his fare, buys a ride to his destination, which he can reasonably expect to be without delay and in comfort.

To give him this requires the equipment to be maintained to a reasonably good standard of condition. Naturally it follows that the management defines what the standard shall be, and the mechanical department can work accordingly.

To keep the maintenance up to the standard of policy decided, you must have an organization of forces which work in harmony. The master mechanic or superintendent of equipment, who is the head of the department, should have the following sub-heads under him, namely; chief clerk, chief draftsman, chief inspector, and the following foremen; machine shop, truck and forge shops, car wiring and controller, armature room, carpenter shop and paint shop. Far better results can be obtained by having the department foreman report direct to the master mechanic, than when there is an intermediate official between them.

Now that we have an organization formulated, we must develop a system of inspection and general overhauling.

MAINTENANCE ROUTINE

The inspection is done in the operating carhouses, under the supervision of carhouse foreman. The general overhauling is done under the supervision of the master mechanic, at the general shops, where he should have his headquarters. Inspection and general overhauling can be done either on a daily basis or on a mileage basis. For inspection, I have found it better to use the mileage basis because some particular car will make more mileage in three days than another car in five days. An economical and efficient basis of inspection is from 1100 miles to 1600 miles, depending on the age of the equipment. On a daily basis the usual time between inspections is seven days. By going to the mileage basis, we find some of the cars out twelve or fourteen days between inspection, while others are only out six or eight.

The main features that limit the mileage between inspections are adjustment of brakes, lubrication of motors and adjustment of controllers.

The average number of cars operated from a carhouse (in San Francisco) is approximately seventy. To take care of these requires the foreman, one carpenter, one controllerman, one man on air and trolleys, two for brakes and bolts, two for oiling and inspecting motors and journals, a night foreman and two repairmen to look over bolts and brakes and to check any defects the motormen might note on their defect cards.

In the operation of an electric railway a number of things can be put off or curtailed without serious results, but not so with the inspection. The inspection can be regulated to do work at the critical moment, but if you go beyond this point the equipment is ruined

*A paper read before the Pacific Railway Club.

and has to be renewed. For instance, the armature of the motor, revolving between field pieces with $\frac{3}{16}$ -in. air gap, has babbitted bearings. Should these bearings run hot, the armature rubs on the pole pieces, ruining the armature and causing the expensive operation of re-winding the armature.

OVERHAULING ON 50,000- 60,000-MILE BASIS

Now as to overhauling. An economical point for general overhauling of equipment is the 50,000 to 60,000-mile period, or approximately every sixteen months. This is about the limit to the wear of wheels and bearings, and also an economical point to touch up and re-varnish the car bodies.

ORDER OF WORK

With limited forces at the inspection stations, it is impossible to do much needed testing. Therefore, it is up to the shop force to look after all tests, while the car is being overhauled. The first test should be the one on the air reservoir. This can be done under hydraulic pressure, without removing the reservoir from the car and before the car is taken inside the shop.

The car is now turned over to the truck-shop foreman, and the car body is raised, the trucks run from under the body and the body placed on wooden horses. To keep the car in the shop the least possible time all departments should start to work on the car together, so that by the time the truckmen have overhauled the trucks, the other departments will have finished their work, with the exception of the paint work.

Before the trucks are dismantled they should be cleaned with sand blast, or other effective means, so as to make inspection for flaws more thorough. Motors then should be removed by crane, wheels removed and brake rigging dismantled. In reassembling the trucks, they should be squared up so as to reduce flange wear of the wheels. As far as possible, new wheels should be used in the overhauled car. Those wheels which are yet serviceable, when the car is brought in, should be reground and used for replacements, when wheels are changed at the carhouses. By the use of bushings, electric welding, and oxyacetylene welding, the brake levers, shoe heads and castings can practically all be reclaimed. In overhauling the motors, the armatures should be removed and thoroughly inspected and tested; the field coils should be tested and terminals inspected, and the inside of motors should be cleaned and painted with waterproof paint.

Brush yokes and holders should be removed, cleaned and repaired. In assembling the motor, care should be taken that the liners do not bind, and that the brush-holders are properly set to give the right space between brushes. The motor can then be mounted on the trucks; and the trucks are ready to be replaced under the car.

The electricians in the meantime have removed all main switches and breakers, testing them and renewing worn parts. The controllers are thoroughly cleaned and adjusted and connections tested. It is good policy to use mostly new fingers on an overhauled car, and send the old fingers that are not worn out to the carhouses for further use.

Air compressors are removed and dismantled, cleaned

and inspected; also gages are removed and reset by the master governor. While this work is going on the carpenters are going over the woodwork. All crews should end in the same period, which should be in three days. The car is then ready for the paint shop, for touching up and revarnishing which take another six or seven days.

With all departments working together in this manner, a car should not be in the general overhauling shop more than an average of two weeks in every sixteen months.

A New Type of Lightning Arrester Spark Gap

Shunting of the Gap with Impedances Proves Effective in Greatly Reducing the "Impulse Ratio" of the Gap

THE term "impulse protective gap" has been applied to a new type of spark gap for lightning arresters which was described by C. T. Allcutt of the Westinghouse Company at the last A. I. E. E. meeting. The principle involved is the connection of two spark gaps in series, these being shunted with unlike impedances. The shunts are made up of combinations of condensers and reactors or resistors, and they are designed so that when high-frequency impulses are received one gap will break down more readily than the other. When the first breaks down the second is stressed to the breaking point and it breaks down in its turn. As a practical matter it has been demonstrated that it is not necessary to have two physically separate gaps, but an electrode can be introduced into the middle of one gap thus subdividing it into series parts.

Experiments, described by the author, were made to determine the best form of electrode, but as far as the new device is concerned, the form of electrode appeared not to make much difference in the result. However, in general, it is best to use such forms of electrodes as will give the highest possible 60-cycle breakdown voltage. This condition is approximated with spherical electrodes.

In considering this new type of spark gap it should be remembered that in general the high-voltage lightning arrester consists of two distinct parts, a spark gap for discharging abnormal voltages and some means for preventing the normal line voltage from maintaining a power arc across the gap. F. W. Peek, Jr., has shown that some forms of spark gap require a very much higher voltage to discharge a high-frequency impulse than is required to discharge a continuously applied electromotive force. The name "impulse ratio" has been given to the ratio of the impulse breakdown voltage to the continuously applied breakdown voltage. The purpose in designing the new form of gap has been to produce one with a low impulse ratio, and the combinations described yield a gap with a ratio less than unity.

In putting forward the results of this work covered by his paper Mr. Allcutt points out that while the impulse gap has great possibilities as a protective device the results so far secured are not conclusive. The new gap must be studied under more adverse conditions before its protective value can be regarded as definitely established.

Women in the Metal Trades

War's Requirements Have Demonstrated Their Efficiency in Machine Shop Work

DISTINCTLY favorable results from the war-time employment of women in the metal trades are shown in a report issued on July 24 by the National Industrial Conference Board. The report summarizes information obtained from 131 establishments employing 335,015 men and 49,823 women. The work done by the women embraces a great variety of processes, from the operation of ordinary drill presses and lathes to coremaking, inspecting and assembling mechanical parts. In the main, their work was confined to the lighter processes in which rapidity and dexterity are more important than technical skill acquired by long training. The report emphasizes that work of a "repetitive" character is exceptionally well adapted to the utilization of female labor.

Employers generally commended women as being more thorough and conscientious, as producing less spoiled work, and as being more careful with tools. In many cases the quantity of work produced was more than that of men, but where less the quality was frequently better. Women were also reported as more regular in production, and as not showing the tendency to restrict output, which is sometimes characteristic of men.

Generally the principle of equal pay for equal work was followed. Work hours of women are largely dependent on the labor laws of the respective states. Nevertheless, in fifty-six establishments of 105 reporting, women were working fewer hours than the legal limit. In most states represented in this investigation the legal

suitiveness to criticism and on the other in increased loyalty.

Greater stability of female labor was generally indicated by the information gathered in the course of the investigation. Of ninety-four employers reporting on this subject, sixty stated that the record of the women was better than that of the men; twenty-six that there was no difference; only eight that the turnover among women employees was higher. In this respect, therefore, the results are exceptionally favorable to employment of women.

Syracuse War Service Committee Greatly Assisted by Local Railways

IN THE recent war service campaign in Syracuse, N. Y., and throughout Onondaga County, the local committee used the decorated two-car train shown in the accompanying photograph. It consisted of an inter-urban car loaned by the Empire State Railroad and a double-truck flat car loaned by the Auburn & Syracuse Electric Railroad.

The cars making up the train were equipped in the Wolf Street shop of the New York State Railways. The motor car was decorated with flags, signs, etc., and the flat car was made into a traveling stage, the scenery in the background being removable so that it could be carried flat on the floor of the car in transit. This car was equipped with two pianos and two rows of foot-lights consisting of high-power Mazda lamps spaced a foot apart. A standard battleship searchlight, loaned by the Crouse-Hinds Company, was used as a signal to the villages that the train was coming.



TRAVELING STAGE AND MOTOR CAR USED IN ONONDAGA COUNTY, N. Y., IN 1918 WAR SERVICE CAMPAIGN

maximum is fifty-four hours per week. In Ohio, however, it is fifty hours and in California forty-eight.

It was the general experience that women are "more teachable," "quick to learn," and that they "follow instructions better" than men. In fact, in 103 establishments reporting, the attitude of women toward their work was considered to be as good or better than that of the men; in only eight was it regarded as worse.

One reason given for this was that the women are superior to the class of men at present available. Some employers reported that the increased demand for the services of women is tending to make them more independent than formerly, although one machine tool manufacturer with wide experience stated that women are "as exacting as men but no more." Women are generally reported as taking a more personal attitude toward their work, which is reflected on the one hand in greater sen-

The train carried twenty Red Cross nurses, a band of seven pieces, a mandolin club, several singers, a "Four-Minute" speaker, and a veteran of the Civil War who has served in the Canadian Army during the present war in France for two years and is now incapacitated.

The train reached from one to three towns each night of the campaign, and at each place an entertainment lasting from thirty to forty minutes was given, followed by short addresses. It played an important part in enabling the city and county to raise a fund of \$2,500,000, an oversubscription of \$500,000. The committee also used an elaborately decorated single-truck open car loaned by the New York State Railways, equipped with a set of electrically operated chimes. This car was used in Syracuse over the lines of the State Railways every day during the campaign.

Principles in Labor Awards

Board Explains General Basis Followed in Its Decisions Made Public Last Week

IN THE official summary of the twenty-two awards in street railway cases of the War Labor Board given out in Washington the end of last week the board outlined some of the principles which it followed in making the various awards. The statement was made public just as the last issue of this paper was going to press, so that only the actual wage rates could be printed. The major principles enumerated by the board as covering its awards follow:

Where the wages of track men, pitmen, pitmen's helpers, controllers, men, etc., were advanced, the plan followed was to increase their wages in the same ratio as the highest increase to conductors and motormen.

In all cases where motormen and conductors are compelled to work in excess of the period of their regular runs they are to be paid on the basis of time-and-half time for the excess, thus placing them on the same plane with skilled mechanics in government industries. This award, the board says, marks a new departure in the adjudication of street railway disputes in that it provides for the penalization of companies for extending the spread of hours in which men perform their day's work beyond the number of thirteen hours. Motormen and conductors in a majority of the cities are compelled to break up their working time during the day on account of the rush hours. Wherever this split of time spreads beyond thirteen hours the companies are penalized by being compelled to pay all the way from one-third time to double time to the workers according to the spread. This, it is believed, will have a tendency to diminish the spread of the work hours of the men.

In calculating the additional pay for overtime the board in several instances cites its decision in the award in the Cleveland Railway case as a precedent. The award in that case was that where the elapsed time consumed by swing runs exceeds fourteen hours, an addition of pay for the period of excess consumed time shall be allowed as follows:

For the fifteenth hour.....	Fifteen minutes
For the sixteenth hour.....	Thirty minutes
For the seventeenth hour.....	Forty-five minutes
For the eighteenth and each successive hour.....	One hour

On Sundays and holidays and on night car runs, the run shall be straight, with no more than eight hours' time, and with ten hours' pay for eight hours' time on night runs.

The award arbitrarily fixes the limit of apprenticeship on the cars at one year. This accelerates the method of graduating the men from one wage classification to another. Thus, instead of compelling men to work a full year before they may expect a wage increase and two years before they may expect a second increase, the award fixes three months as the first period upon the completion of which men shall receive their first increase and the second increase is made payable nine months after receipt of the first one. Heretofore, the wages have been raised in small amounts every year, covering fixed periods, so that in several instances which have come under the observation of the arbitrators it took ten years for the motorman or conductor to get the highest wage rate paid by the company.

While it is difficult to state definitely the exact per-

centage of increase granted in the awards, it may be said that in the larger cities the increase is from 35 to 40 per cent. The increase in Detroit, for instance, approximates 40 per cent, in New Orleans 50 per cent. In the smaller cities, such as Galesburg, Ill., it runs as high as 65 per cent on account of the extremely low pay received by the men up to this time. In New Orleans the wage was fixed lower than in other larger cities, the principal reason being the climatic conditions which made possible the omission of the items of fuel and heavy clothing from the cost of living budgets.

In cases where the right to organize has been an issue, the arbitrators applied the War Labor Board principles protecting workers in the exercise of their right to join trade unions without fear of molestation by the employer. Where individual employment contracts have been exacted by employing companies they are ordered eliminated for the period of the war on the ground that they constitute an interference with the free right of men to organize. Such an order was made in the case of the Omaha & Council Bluffs Street Railway. The administrators were called upon to render a decision with respect to the right of organized operatives to wear the button of their local union in the case of the Columbus Railway, Power & Light Company. This question, the board says, has frequently become an issue between street railway companies and their employees. In the Columbus award the arbitrators declared their inability to "see any objection under ordinary circumstances to the workers wearing a modest button of the ordinary size and design, worn presumably not for any objectionable purposes, but as men wear Red Cross or fraternal buttons." In the same case four men named as having been discharged for union activities were ordered reinstated in their former positions and ratings with full pay for lost time.

The War Labor Board says it "is now engaged upon investigations preliminary to decisions by the two chairmen in the street railway controversies which have come before the Board during the course of consideration of the cases decided today. A staff of women investigators is conducting an investigation of street railway industries with regard to the employment and treatment of women who have been entering the industry in large numbers in several communities. The attitude of the National War Labor Board toward the employment of women," it says, "is that they should receive for their services pay equal to that received by men for performing like services."

In the case of the Detroit United Railway the board says that "No objection shall be made to the employment of women or colored men, if necessity arises."

In the case of the Public Service Railway the board says that the "pay of men failing to answer roll-call on any one day or days shall be reduced only in the proportion that the roll-calls he fails to answer bear to the total number of roll-calls during the week."

CASES STILL TO BE DECIDED

The board says that it has still before it sixteen cases undecided, giving the cases by name. It says that the decisions in these cases will be handed down as rapidly as possible.

The board estimates the number of men affected by the decisions already rendered at 50,000.

AMERICAN ASSOCIATION NEWS

War Board Issues Bulletins

THE American Electric Railway War Board has issued three bulletins during the past week. Bulletin No. 25 contains the brief statement issued by the National War Labor Board denying that it has any intention of promulgating a flat wage rate for motormen and conductors of 50 cents an hour as reported in the daily press. Bulletin No. 26 is twelve pages in length and gives the full statement issued by the War Labor Board in regard to the twenty-two wage cases decided by the board last week. Bulletin No. 27 gives the text of the letter addressed to the president by Charles E. Elmquist, president National Association of Railway & Utility Commissioners, and Joseph B. Eastman, chairman special war service committee of that association, advising the appointment of a national administrator or board of three, as reported in the issue of this paper for Aug. 3.

The War Board held a meeting in New York on Aug. 6.

LETTER TO THE EDITORS

Use Salesmanship in Selling Transportation

NEW YORK CITY, AUG. 5, 1918.

TO THE EDITORS:

Although Demetrius Econoupoulos charges 5 cents for a single apple in order to enjoy a reasonable rate of return upon his investment, it is notorious that the wily Levantine wholesales the same wares at six for a quarter. Why not consider the case of Mr. Econoupoulos as applied to the sale of tickets at a slightly reduced rate? Demetrius knows that by selling his apples at the lower rate for a wholesale purchase, the buyer will surely consume more, but few railway men seem to believe that by selling tickets, preferably of metal, at the reduced rate for a wholesale purchase, the buyer will surely ride more.

Too many railway men seem to think that the fewer tickets they can sell to comply with franchise stipulations, the better off they will be. Hence they limit their sale to the company offices and to a few stores, which do more to get the privilege than the railway man does to induce them to accept it. They ought to realize that it is as hard for a man with tickets in his pocket to refrain from riding, if there is a car in sight, as for a man with apples in his pockets to refrain from eating. There is absolutely no difference in principle. What is more, much of the extra riding will be shorthaul, downtown riding or riding during the noon-time off-peak period.

"Nonsense," or some shorter expletive, utters the operator when urged to sell transportation upon merchandising principles. "This game is different." Is it really different in its appeal to the bargain instinct? Of course it isn't. The railway man's own crude selling of the past proves it! What about those parks with their twelve months' investment for three months' business, their heavily cut rates, their maximum length

rides, their frequent accidents, their waste mileage, their hours of costly layovers at park sidings? Should those who were so keen for that kind of traffic creation despise a plan that increases the only kind of riding that brings a profit—the short pick-me-up of a few blocks?

To come down to hard pan: Here's a case vouched for by the financial officer of a certain railway. His company used to sell metal tickets at a 5 per cent reduction for \$1 lots. People bought them freely and rode with reckless abandon. The railway man, whose pass privileges do not extend to his own large and interesting family, always had a pocketful of tickets and never hesitated to comply with: "Daddy, kin y' give me some tickets for the street car?" Now he says that such a request means cash, and the youngsters ride only one way to or from school instead of both ways.

Take a second case: A certain franchise calls for a 10 per cent reduction on metal ticket sales in quantities of \$1. The tickets are sold only at the railway office and some department stores—very, very quietly. Result: Less than 8 per cent of the riding by adults is on metal tickets. The company has obeyed the letter but not the spirit of the law. Here's a true incident to prove that this policy is not for the best interests of the railway. In the office building of this company is a bright young man who discovered that tickets could be bought at 10 per cent off. Unselfishly he passed the good news on to a number of his female friends whose bargain instinct was aroused at once. They never ride without tickets now, and they do a lot of noon-time riding they never did before.

The third case will make it clear that I am not talking about the justice or injustice of a given rate of fare but of the principle of wholesale rather than of retail riding. A company which had secured the right to charge a 6-cent fare decided to put on sale a 6-cent metal ticket to avoid the inconvenience of collecting the odd fare but made no plan for selling these tickets in quantities at a discount. Why should it expect the public to go to the inconvenience of purchasing such tickets in advance simply to make the work of collection easier?

For obvious reasons the sale of such tickets should not be conducted on the cars, but a most intensive selling campaign should be carried on elsewhere. Undoubtedly many merchants would be glad to have them for their change-making value alone in these days of small coin shortage. A company could well go still further by providing the merchants with cards reading: "Save time and annoyance in boarding cars by having exact fare. Reduced rate tickets for sale here." "Ask for part of your change in reduced rate car tickets. Why walk with those bundles?" "Your time is worth more than the cost of a street car ride. Reduced rate tickets for sale here." I venture to say that with 90 to 95 per cent of adult riding in ticket sales, schedule speeds would rise, earnings would go up, operating expense would go down, speculation would be practically abolished and the honest conductor's work made much more agreeable. In all probability, also, the sale of tickets bought but never used because of being lost or carried away by visitors to the community would prove a neat little by-product in itself.

"TRANSPORTATION."

Unloading Dry Sand by Pneumatic Pressure

Equipment Built by St. Louis Railway Delivers 150 per Cent More Sand per Day With Half as Many Men

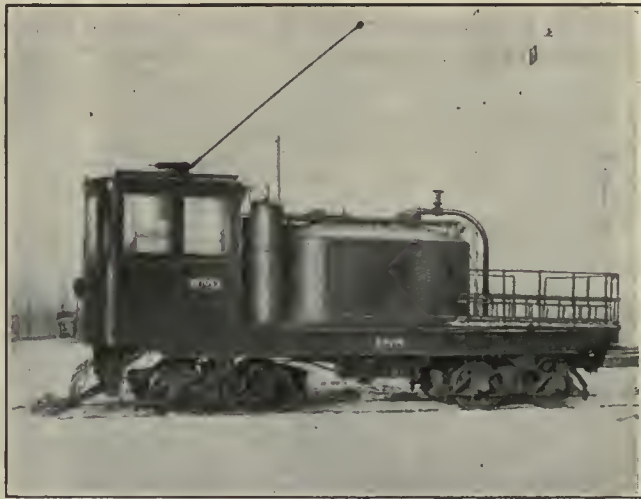
BY BENJAMIN F. THOMAS, JR.

Mechanical Engineer, United Railways of St. Louis.

THE problem of distributing dry sand to car sheds has been solved very successfully by the United Railways of St. Louis. In November, 1917, the dry sand car illustrated, designed and built by the company, was put into operation. From this car the sand is unloaded by the application of air pressure and the results have been very gratifying in the amount of labor saved and in reducing the amount of time necessary to unload. With a crew of two men, the car will deliver about 1000 cu. ft. of sand per day, as compared with 400 cu. ft. per day with four men when unloaded manually. This general method is not original with this company as it has been used for some time by the Philadelphia Rapid Transit Company. (See the issue of the *ELECTRIC RAILWAY JOURNAL* for April 25, 1914, page 910.)

The construction details of the car are shown in an accompanying illustration. The body of the car consists of a 15-in. 60-lb. I-beam frame mounted on the company's standard diamond-frame truck and driven by four 50-hp. Westinghouse motors. The car is 30 ft. long over the bumpers, and approximately 8 ft. 6 in. wide.

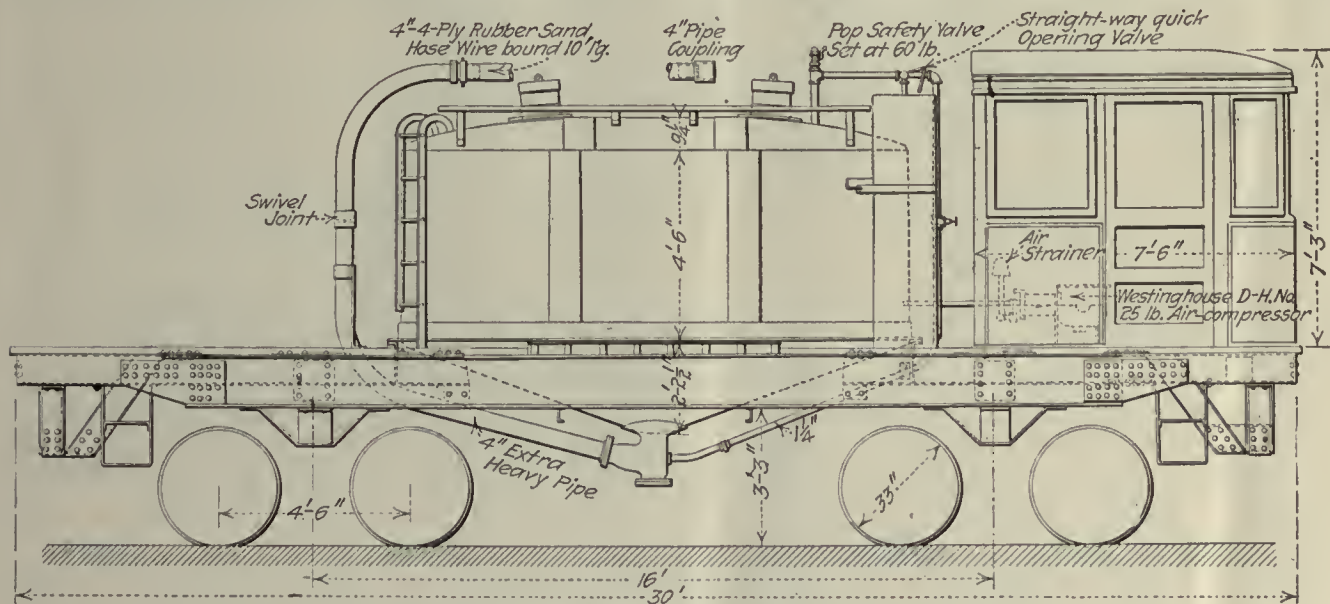
The large sand tank, which is 12 ft. in diameter and has a capacity of 360 cu. ft., is placed in the middle of the car. In the concave bottom of this tank there is



PNEUMATIC SAND CAR BUILT BY THE UNITED RAILWAYS OF ST. LOUIS

be turned at any angle. Directly opposite this opening in the casting is a 1½-in. pipe leading to the compressed-air equipment.

The compressed-air equipment consists of two type DH-25 Westinghouse motor-driven compressors capable of delivering 25 cu. ft. of air per minute at 90 lb. pressure, and two 18-in. x 72-in. air reservoirs which are connected to the sand tank through a quick-opening valve. The compressors are located in the driving cab which takes up 7 ft. 6 in. of space at one end of the car. This cab has a 30-in. sliding door in the rear end and is 7 ft. 3 in. high, giving a total height from top of rail of 11 ft. 10½ in. The air reservoirs are located between the cab and the tank. After having been in



DETAILS OF CONSTRUCTION OF PNEUMATIC SAND CAR

an opening to which is riveted a T-shaped casting. A 4-in. discharge pipe leads from one side of this casting and extends vertically up the back of the tank and over the top by means of two large radius bends. A wire-bound rubber hose is attached to the free end of this pipe. There is a 4-in. gate valve at the end and a swivel joint between the bends so that the pipe may

operation some time, it was found to be advantageous to install two additional air reservoirs of the same size and so arranged with check valves that a back pressure of 20 lb. is always upon the compressors. This is to prevent the compressors from racing when the pressure in the reservoirs is suddenly thrown into the sand tank. The rear end of the platform is surrounded by

a railing and is available for the transportation of men or materials.

The operation of the car is very simple. The car is loaded at the dry sand plant through the two openings in the top of the sand tank. The caps are screwed on and the car proceeds to the bins. Pressure is pumped up in the reservoirs while the car is traveling and upon arrival is turned onto the sand through the quick-opening valve at a pressure of from 25 to 60 lb. per square inch. The sand is forced down into the T-shaped casting at the bottom of the tank and, assisted by air pressure entering the T through the 1½-in. pipe, is forced up and out through the stand pipe and hose. Sand begins to flow at 25 lb. pressure, but operates best at about 40 lb. The tank is designed for 60 lb. working pressure, and is protected by a safety valve at the top of the tank.

Power-Operated Train Order Signals Produce Economies on the Erie

A Comparison of Improvement in Train Operation by Use of Automatic-Signals Instead of Manual Signals or Telegraph Train Dispatching

A COMPARISON of the results of train operation on the Erie under two different systems of signals is made by Henry M. Sperry in the *Railway Age* of July 5. The Susquehanna division of the Erie was selected for making this comparison, as any resulting improvements would be due entirely to the signal facilities, there being no change whatever in track facilities or motive power.

Prior to the installation of the automatic block signals, the Susquehanna division was operated under manual block signals. The average length of the blocks was 3.07 miles and there was a great difference in the length of the various blocks, the shortest block being but 0.3 mile in length while the longest was 7.27 miles long. This variation in block lengths is characteristic of the manual block, as the block stations are usually placed at passenger stations, passing sidings, junction points, etc. As a result it is often impossible to avoid delays in trains which are required to move under close headway.

Under the manual block system train dispatching was by written train orders sent by telegraph. This system caused a loss of time in operation as trains were required to either slow down or stop in order to receive their orders, which were necessary for all special or irregular movements. The old style written train orders were replaced with three-position signals electrically operated. The three-position train-order signal is an electric motor signal on the same mast with the automatic block signal and is located at passing sidings or crossovers. The control of these signals is from the nearest day and night train order office, making it possible for the train dispatcher to direct the operation of these signals by telephone instruction to the offices controlling them. With this method it is a comparatively simple matter for the train dispatcher to display the required signal indication for directing train movements at the various sidings. Trains at the blind sidings either continue on the main track or take the siding as required by the signal indication of the train-order signal. If they enter the siding they report by telephone to the office from which the train-order signal is controlled. The dispatcher makes no record of the train movement authorized by him until after the train has acted upon the instructions of the train-order signal.

Under the method of train orders by signal indication, the dispatcher with a few words over the telephone directs the signal. The train is not required to slow down simply to receive instructions, as the instructions are conveyed to the train by the unmistakable indication of the train-order signal. Further, these instructions are given to the train at the point where it is required to act upon them and not at some distant point as is often the case under the written train-order system.

The improved results in train operation have more than justified the installation of this system. Delays to freight trains due to the manual block have been practically eliminated. The train load has been increased and the time consumed in passing over the division has been reduced 15 per cent. The accompanying table shows the improved results which were accomplished.

TABLE I—RESULTS OF FREIGHT TRAIN OPERATION ON THE SUSQUEHANNA DIVISION—ERIE RAILROAD
For Months of December, 1909, to November, 1910, Under Manual Block
Compared with Months of December, 1910, to November, 1911, Under Automatic Block

Months (a)	Ton Miles		Ton Miles per Train			Reductions a/c Temperature			Freight Trains				Saving in Freight Trains (n)	Saving in Train Operation (o)							
	Manual Block (b)	Automatic Block (c)	Manual Block (d)	1909-10		1909-10 (See Note a) (g)	1910-11		1909-10 (See Note b) (h)	1910-11 (i)	1909-10 (k)	1909-10-11									
				Manual Block (e)	Auto- matic Block (f)		Manual Block (j)	Auto- matic Block (l)				Manual Block (m)			Auto- matic Block (n)						
December	173,387,082	177,605,007	227,542	217,757	226,285	8.5	12.8	+4.3	762	811	778	33	\$4,511								
January	162,944,115	194,134,250	224,750	252,392	251,795	12.4	9.0	-3.4	725	835	771	64	7,401								
February	154,443,876	180,987,865	225,136	231,215	252,072	12.0	9.3	-2.7	686	782	718	64	7,629								
March	199,235,797	178,197,673	247,497	239,577	244,106	6.0	9.2	+3.2	805	744	730	14	4,284								
April	151,746,585	168,295,833	245,320	241,640	256,548	2.2	3.7	+1.5	535	696.5	656	40.5	6,512								
May	170,527,993	189,061,368	268,548	268,348	276,002	0.0	0.0	0.0	635	704	685	19	4,931								
June	160,521,776	202,898,946	250,815	250,815	293,206	0.0	0.0	0.0	640	809	692	117	11,944								
July	189,088,090	207,184,154	271,289	271,289	298,106	0.0	0.0	0.0	697	764	695	69	8,242								
August	195,754,433	203,503,501	292,921	292,921	302,632	0.0	0.0	0.0	657	683	672	11	3,834								
September	195,588,923	189,772,505	273,550	273,550	296,057	0.0	0.0	0.0	715	694	641	53	7,041								
October	210,030,555	221,607,785	260,583	260,583	308,216	0.0	0.0	0.0	806	850	719	131	12,765								
November	195,119,249	208,820,764	267,653	263,370	295,700	3.7	5.3	+1.6	729	792.9	711	81.9	8,875								
	2,137,868,274	2,322,070,451	254,751	254,054	274,217	44.8	49.3	+4.5	8,392	9,165.4	8,468	697.4	\$87,969								
			(Average)	(Average)	(Average)																

NOTE.—(a) The "Ton miles per train" under manual block (corrected Col. e) are the totals for 1909-10 corrected by the difference in temperature of the winter months of the two years in order to place the totals for the two years on an equal basis in respect to weather conditions.
(b) The "Reduction on account of temperature" (Cols. g and h) are the percentages by which the monthly ton mile totals were reduced on account of low temperatures. These percentages were used to arrive at the totals under manual block (corrected).
(c) The "Freight trains" manual block (corrected Col. l) were computed by dividing the "Ton miles per train" manual block (corrected Col. e) into the ton miles per month moved under the automatic block (Col. c). The results (Col. l) show the number of trains that would have been required to move the traffic that was moved under automatic block if the trains had been operated on the manual block basis.

Center-Entrance and Exit Cars for Allentown

Lehigh Valley Transit Company Installs Twenty-Four New Cars to Provide Increased Service to Training Camps

THE Lehigh Valley Transit Company operates 215 miles of electric railway in eastern Pennsylvania and western New Jersey, serving Allentown, Easton, Bethlehem, South Bethlehem and numerous other towns and boroughs. It furnishes high-speed limited service between Allentown and Philadelphia. Allentown is one of the principal cities in the Lehigh Valley and is located in the center of the great cement belt and 30 miles south of the anthracite coal fields. The government has leased the Allentown fair grounds as a training site for the United States Army Ambulance Corps and has several thousand men stationed there.

Due to these activities and to those of the Bethlehem Steel Company, located at South Bethlehem, it was recently decided to purchase twenty-four new double-truck cars for city and suburban service. A careful study was made of the latest equipment in large Eastern centers, and as a result it was decided to design a light-weight, prepayment, center-entrance and exit type of car, with double truck, and of all-steel construction.

The cars as purchased are 47-ft. over-all length and 8-ft. 6-in. over-all width. They have entrance and exit doors at the center on both sides, and a door for the motorman and for emergency exit at diagonally opposite corners. Equipment is for double-end operation with couplers and multiple-unit control for train operation during rush hours. The conductor's door control standard is at the center. The doors, equipped with Brill automatic mechanism, fold outwardly, operating in conjunction with a single folding step. The door opening is 4 ft. 10 in. wide with no stanchion in the middle. A 3½-in. depression in the floor at the cen-



PASSENGERS BOARDING CAR AT STOP

ter and 26-in. diameter wheels, gives steps of 15½-in. and 13½-in. respectively.

With the exception of four longitudinal seats at the center doors and one in each end at the left of the motorman's position, all seats are arranged transversely. The seats are of the Brill "Winner" type with a total capacity of fifty-seven.

Windows are provided with metal sash, stiles fitting the "Renitent" post construction. The lower sashes raise to a height above the eyes of the seated passengers. The vestibule windows drop into pockets and the

sashes are provided with racks to hold the window at various heights.

The floor of the car is double, the first layer being of ¾-in. yellow pine and the upper one of ¾-in. maple. Oak strips are laid in the aisle between the cross seats and at the doors. The inside walls of the car body below the side windows are lined with Agasote ¾-in. thick and having ½-in. air space between inside and outside sheathing. The roof is of the plain arch type supported on pressed steel rafters and sheathed with



INTERIOR ARRANGEMENT OF CARS

¾-in. tongued and grooved poplar boards covered with No. 8 cotton duck. Eight Automatic Ventilator Company's ventilators are placed four on each side of the roof. Ceilings are lined with Agasote, painted white.

Each end of the car is provided with a 6-in. channel bumper faced with a 6-in. Hedley anti-climber and reinforced with a ½-in. x 22½-in. steel anti-telescoping plate. Westinghouse car and air couplers are furnished, also HB lifeguards and Horne double-acting hand brakes. The sand boxes have Ohio Brass Company's air valves.

The trucks are Brill 77-E-1, equipped with Davis steel wheels, hammered steel axles and Westinghouse 514-A motors.

Other features of the car equipment are Adams & Westlake gongs, Pantasote curtains, Cooper No. 12 heater, International type R-5 double register, Keystone illuminated car signs, Ohio Brass Company trolley retrievers, Keystone bell and buzzer high-voltage system with push buttons on each side post, Electric Service Supplies Company's bronze lamp fixtures and shades and Pyrene fire extinguisher.

These cars will be operated from Allentown to Bethlehem, a round-trip mileage of 15.56 miles and 16 miles respectively. No terminals are provided as the cars make a loop in both cities. An amusement park owned and operated by the company and located midway between Allentown and Bethlehem furnishes especially heavy traffic in the summer months. It is expected that the new cars will show a marked reduction in the time element of loading and unloading.

A bill has been presented to the Municipal Council of Tokyo favoring the extension of the local electric railway system. Extensions of about 54 miles are proposed for the next four years.

Hard Spots in Trolley Wire Result from Hammering of Trolley Wheels

Flexibility of Supports and Light-Weight Fittings Will Reduce Hammering and Result in Increased Service

BY G. H. BOLUS

Designing Engineer The Ohio Brass Company

TROLLEY wire freely suspended between supports assumes a catenary curve the depth of which is governed by the weight of the wire, the tension to which it is subjected and the distance between supports. If a trolley wire could be suspended between supports without sag the ideal condition would be approached. The catenary type of construction with messenger wire and hangers of various lengths approximates this, but even with a spacing as short as 10 ft. between hangers there is some sag in the trolley wire.

The catenary type of construction is not well adapted to city service as the extra number of fittings required

The effect of hammering is sometimes found at the center of the ear directly under the boss. This is caused by the wheel actually leaving the wire at the ear approach and striking under the boss.

Flexibility at supports and light-weight fittings will reduce hammering, and an ear using a flat steel spring to connect the boss to the runner has been used with success, although the regular type of ear will give perfect results if sags and cross-spans are properly handled. In cross-span construction the hammering effect due to hard spots at supports may be modified by slacking off on the cross-spans so as to allow the wheel to lift the span slightly. Tight spans produce hard spots and put an unnecessary strain on poles and guys.

Vibration is present in the trolley line and if damped out suddenly or localized produces crystallization and early breakage of trolley wires. For this reason frogs, crossings and section insulators, while usually made of malleable iron, are fitted with bronze approaches or shock absorbers to absorb the vibration gradually and minimize wire breakage due to crystallization.

A broken trolley wire is a dangerous thing not only to traffic and pedestrians, but if it should "freeze" to the rail it would undoubtedly be annealed for some distance, in most cases back to the first feed point. A corrective measure sometimes used to prevent this with double-track construction is to cross-connect the trolley frequently so that only a very short length of wire could be damaged. It should be remembered that copper trolley wire which has become annealed has less than 50 per cent of its initial strength and its resistance to wear is greatly reduced. Copper alloy trolleys do not seem to anneal as readily as copper, but they have a tendency to break up into short pencils.



REDUCED SECTION OF TROLLEY WIRE COMMON AT EAR APPROACHES

and the cost are against it. The most common construction for this service consists of direct suspended trolley wire supported by brackets or cross-span wires every 100 ft. With such a spacing of the supports there is more or less sag. For instance, at 1800-lb. tension a No. 00 copper trolley wire sags 3.36 in.

When a trolley car equipped with pole and wheel having, say 25-lb. tension, is run under a stretch of direct suspended trolley wire the wheel moves in both a horizontal and vertical direction, the latter due to the sag in the wire. In other words, the trolley wheel travels a greater distance than the car. An abrupt change in direction of motion occurs at support points, which causes a hammering or hollowing out of the trolley wire by the force of the blow.

In practice the points where hollowings occur in the contact wire are usually spoken of as hard spots in the line and they are present at all supports and between supports where a very heavy trolley splicer is used to connect two small trolley wires. They are also very common under elevated structures and the like, due to the unyielding nature of the supports.

An accompanying illustration shows two ears removed from different properties where slack trolley wire and high base tensions are common. The reduction in cross-section of trolley wire at the approach end of the ears due to the hammer blow from the wheel is clearly distinguishable. The properties using these ears are widely separated geographically.

Brass Footing for Metal Dashers



DASHER WITH STRIP OF BRASS AT FLOOR LINE

SHEET iron or steel dashers are apt to rust along the lower edge on account of the moisture which accumulates on the inside at the point of junction with the floor. The Rhode Island Company at its Providence shops finds it economical to cut away the lower part of rusted dashers, replacing it with sheet brass, a strip about 10 in. wide being riveted on in place of the discarded metal. The accompanying photograph shows the "rejuvenated" dasher in place.

Conserving Domestic Sizes of Coal

The Detroit United Railway has been conducting tests to determine if buckwheat size anthracite, bituminous coal or coke cannot be used as fuel for their car heaters. These tests were made at the suggestion of the Fuel Administration as it is considered extremely unlikely that any domestic sizes of anthracite will be available for industrial or public utility use during the coming winter.

Auto-Trolley-Car Shows Big Saving in Operating Costs

Passengers Call Them "War Cars" and Consider Their Operation as a Patriotic Measure Adopted by the Company

AS DESCRIBED in the *ELECTRIC RAILWAY JOURNAL* of May 18, page 977, the Westchester Electric Railroad Company of the Third Avenue Railway System, New York City, began placing cars of the one-man pedal-controlled type in service on its Chester Hill line early in May. Since their initial introduction here cars of this type have been gradually introduced on three other lines and it is expected that eight short lines will be completely equipped with them within the next two months.

Results so far have been very gratifying both in regard to the type of service provided and its resulting costs. Indications are that lines which have always been "lame ducks" and have been previously operated at a loss will be able, by the use of this type of car, to show a reasonable return upon the investment in them.

In adopting this type of car the company has pursued the policy of making the change to one-man operation only as fast as the men left the company's employ or were taken for war service, and none was displaced in the change. The rate of pay for operators on this type of car is 30 cents per day higher than in two-man operation and the labor is less trying. As a consequence the men are anxious to obtain a chance to operate the cars and many have requested permission to "break in" on their own time.

On the Chester Hill line the average payroll for operation a year ago was \$330 per week. This has now been reduced to \$200 per week, a saving of \$130 or about 40 per cent. At the same time the operators are receiving more returns, as already suggested. Passengers are referring to cars of this type as "war" cars and they consider their introduction in the nature of a patriotic measure on the part of the company. As these cars replace older ones with fewer conveniences, and as the new cars are clean, bright and sanitary, all patrons are immensely pleased with the change.

In starting operation on a new line, the cars are first placed in regular service with a motorman, a conductor and an instructor. This avoids any delays or inattention that might result from unfamiliarity with the equipment. When the operator and the public have been somewhat accustomed to the change, regular one-man operation is taken up.

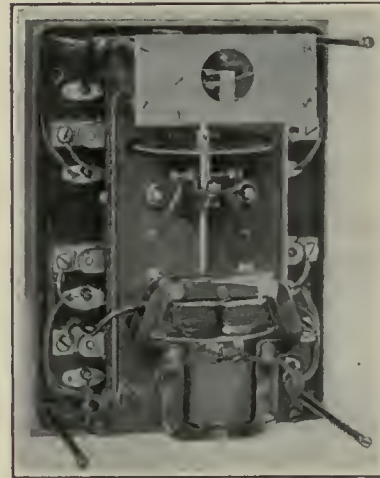
As the principal object of pedal operation of the equipment was to give greater freedom to the operator for supervising boarding and alighting, and to leave his hands free for making change, the question of whether the men should be permitted to make change with the car in motion had an important bearing. Results have shown that an experienced operator can collect one or two fares after starting the car without increased hazard. In average service there are not more than one or two passengers left standing on the platform after the doors are closed. The operators are provided with a change-carrying machine to assist them in their duties. Of course, at intersecting points or when the cars are crossing busy thoroughfares it is considered advisable

for the operators to devote their whole attention to the operation of the car rather than to risk an accident for the small saving in time that would result.

The management of the road is particularly impressed with the field for the use of this car in putting back in their service soldiers who return partly disabled from the front, thus giving them a useful occupation and assisting them to become operators instead of helpless dependents.

Polyphase Induction Reverse Power Relays

THE polyphase induction reverse power relay here illustrated has been brought out by the General Electric Company. It will operate correctly on practically all single-phase short-circuits, even though the

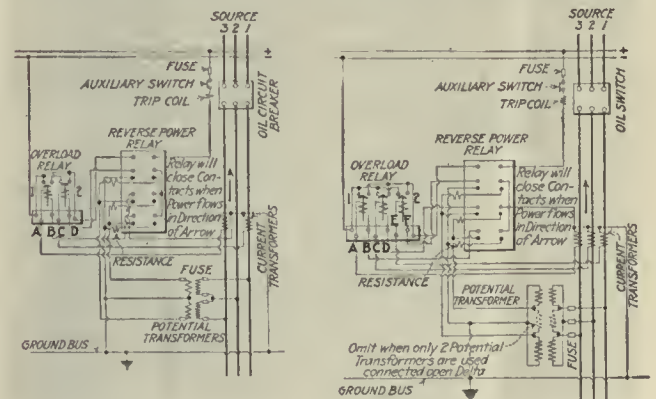


INDUCTION POLYPHASE REVERSE POWER RELAY

voltage between two lines which are short-circuited may fall to zero, on balanced three-phase short-circuits with 10 amp. secondary and 1 per cent of normal voltage remaining and in practically every case on balanced short-circuits, with a voltage of one-half of 1 per cent normal. The relay is constructed along the lines of a polyphase watt-hour meter, but with three instead of two

driving elements. Each of the elements has a current and a potential coil.

Two disks connected to a single operating shaft are used, the upper one of which is driven by one element



REVERSE POWER RELAY CONNECTIONS FOR UN-GROUNDED AND GROUNDED CIRCUITS

and the lower by two elements, one in front and one in back.

The use of three elements is required for grounded Y circuits. For ungrounded circuits two current and two potential transformers are sufficient. The third current coil carries the resultant current of the two current transformers and the third potential coil is connected

across the open delta of the two potential transformers.

The relays are built with single or double-throw contacts which, however, carry for only an instant the tripping current of the automatic circuit opening device, because the closing of these main contacts sends the entire tripping current of the breaker being protected through the operating coil of an auxiliary relay within the case of the reverse power relay and causes its contacts to close and short-circuit the main relay contacts. The auxiliary contacts are sealed closed by the tripping current until the trip circuit has been opened by means of an auxiliary switch on the air or oil circuit breaker. The breaking of the tripping current by this auxiliary switch permits the auxiliary relay to open.

Vibration is practically eliminated even at very heavy currents.

The relays are made sensitive in order to operate properly on very low potentials. Thus overload relays must be used in conjunction with the reverse power relays to prevent operation at normal potential until a predetermined current and time are reached. The contacts of the overload and reverse power relays are connected in series so that both must close to trip the breaker.

Coin Handling Machines Save Labor in Sorting and Counting Money

MUCH labor is saved daily at the offices of the Detroit United Railway by automatic coin handling machines. A bank of machines made by the Sattley Coin Handling Machine Company of Detroit, Mich., handle an average of 200,000 coins each day.

The machines, operated by Westinghouse $\frac{1}{2}$ -hp.



BANK OF AUTOMATIC COIN HANDLING MACHINES

motors, receive the miscellaneous coins in the hoppers at the top. Without further attention, battered and badly-worn pieces are thrown out and the remaining coins are sorted into their respective denominations. These are accurately counted and properly wrapped in rolls of any desired amounts. Thus a great deal of time is saved and the element of error is reduced to a minimum.

Types of Track Construction Used in Brooklyn During 1917

Construction, Reconstruction and Modification are Necessary to Meet the Intensified Conditions Caused by the War

IN A REPORT recently prepared within the way and structure department of the Brooklyn Rapid Transit System several changes in track construction are given.

It appears that the installation of the general standard surface track construction as adopted in 1911 has been continued but modified by the use of cast-weld joints of which there are more than 13,000 now in service on that system. The use of continuous joints was resumed last season for certain short sections where conditions are against welding economically. The use of gravel concrete was practically discontinued in favor of $\frac{3}{4}$ -in. crushed stone screenings. The standard track construction now calls for 7-in., 122-lb. grooved girder rail; 6-in. x 8-in. x 8-ft. rough yellow pine ties; standard flat tie rods spaced 8 ft. apart; four standard hook head spikes per tie; cement mortar rail filler; new 5-in. granite blocks with cement-grouted joints on gravel or crushed stone concrete base; gravel concrete mixed 1 to 3 to 6, and extending down from 1 in. above the ties to the level of the bottom of the ties. The crushed stone screenings concrete was mixed $\frac{3}{4}$ to 2 $\frac{1}{2}$ to 6. The grout mixture of one part cement to one and one-half parts sand has also been continued.

The spacing of tie rods was increased from 6 ft. to 8 ft. on centers, partly to offset the increase in cost of the rods and partly because it was decided that the new 122-lb. rail, being stiffer laterally, does not need to have the rods spaced as closely as with the former standard rail. The granite pavement installed in 1916 with pitch and sand joints has given excellent service so far, indicating that this type of paving joint is very satisfactory for use under heavy team traffic conditions.

A second gasoline motor roller was secured early in 1917 and the two rollers have been used to good advantage in rolling sub-grades. The roller has also been used to assist in cutting asphalt into 2-ft. strips by rolling a special T-iron into the surface. This practice has eliminated excessive asphalt surface restoration work, and practically no men are required now for cutting work. This yields a considerable saving.

The curved-head rails installed in 1915 and universally since that year have not shown any signs of corrugation as yet. Corrugation usually develops within two years at the latest after installation and it is felt that the curved heads have accomplished the main object claimed, namely, the postponement, if not the actual elimination of corrugation. It may be noted in passing that the American Electric Railway Association is seriously considering the incorporation of the curved head idea in its standard design for 7-in. grooved girder rail.

The curved head rail section used by the Brooklyn Rapid Transit Company is a modification (in the head contour only) of the association standard 7-in. grooved girder rail, and is known as L. S. Company section 122-491. The difficulty in gaging this rail has been overcome by the adoption of a new standard track gage adopted after consultation with the mechanical department.

News of the Electric Railways

TRAFFIC AND TRANSPORTATION

FINANCIAL AND CORPORATE • PERSONAL MENTION • CONSTRUCTION NEWS

P. R. T. Increases Wages

Additional Wages Granted by the Philadelphia Rapid Transit Company this Year Aggregate \$4,000,000

To save the War Labor Board the bother of passing on the carmen's wage question in Philadelphia and to give incentive to the men further to facilitate the transportation of war workers, the management of the Philadelphia Rapid Transit Company on Aug. 4 announced to the Employees' Co-operative Committee that, effective Aug. 4, wages would be increased to a maximum of 48 cents an hour, the amount which the War Labor Board required railway companies in other large cities to pay their men. This increase in wages and the other advances granted since the beginning of the year aggregate more than \$4,000,000.

A letter sent by Mr. Mitten to the War Labor Board said in part:

"The contract (for the operation of the high-speed lines) approved by the city and now before the Public Service Commission provides the machinery for such increase in fare as should protect the solvency of the company, and it is only in the event that this contract be not approved that we may be obliged to ask that your honorable board then use your good offices for us to the same extent that may be done in the interest of other cities making similar increases in wage."

SOME DETAILS OF WAGE SCALE

The wages of trainmen are to be increased and adjusted as of the pay-week commencing Aug. 4 to conform to the wage scale now made effective by the War Labor Board in cities of the first class, in cents per hour, namely:

	Conductors and Motormen	
Surface System:		
First three months.....	43	
Following nine months.....	46	
Thereafter	48	
	Mo-Conduc- tormen	Guards
Elevated system:		
First three months.....	46	43
Following nine months.....	49	46
Thereafter	51	48

Where the over-all time of swing runs exceeds fourteen hours, an addition of pay for the period of such excess time is to be allowed as follows:

For the fifteenth hour.....	Fifteen minutes
For the sixteenth hour.....	Thirty minutes
For the seventeenth hour.....	Forty-five minutes
For the eighteenth hour and each succeeding hour	One hour

Time and a half will be paid for extra trips or tripper service.

These rates eliminate the nine-hour minimum guarantee, present allowance for trippers, present allowance for

swing runs, weekly guarantee to extra men, together with any other limitations, time allowance or guarantees heretofore existing.

The wages of all other employees are now being considered for an adjustment which will be made effective as of the same date, Aug. 4.

Student Training Corps Plans

The War Department has recently announced an arrangement by which college students more than eighteen years of age may enlist in the military forces of the country and obtain training in college which will prepare them for the service. They will enlist in what is called the Students' Army Training Corps and will be provided with uniforms and equipment by the War Department, but will be on furlough status. They will receive regular military training and will be subject to call, but the policy of the government will be to keep members of the corps in college until their draft age is reached or possibly longer if the needs of the service, e.g., for doctors, engineers, chemists and the like are such as to make that course advisable. Camps for these students will be held at Plattsburg, N. Y., Fort Sheridan, Ill., and Presidio, Cal.

Seattle Wages Fixed

As a result of numerous conferences between officers of the Puget Sound Traction, Light & Power Company, Seattle city authorities, and representatives of the street carmen's union, extending over a period of weeks, a wage scale has finally been decided upon, and ratified by the union.

The agreement under which the street car strike of a year ago was ended expired on Aug. 1, and the new wage scale will date from that day. However, before the agreement can become effective the revenues of the company must be increased. In case the city shows no disposition within twenty-one days to assist the company, or is unable to devise means of affording relief, the union will appeal to the National War Labor Board, and at the same time the company will carry its case to the proper government officials. In the meantime the platform men will continue working under the present arrangement, with the understanding that their increased pay is to be made retroactive to Aug. 1.

The new wage scale increases the present wage of 33 cents to 40 cents an hour to 50, 55 and 60 cents an hour. Other conditions will remain practically the same as under the old agreement.

Ordinance Before Council

Chicago Measure Will Come Up for Passage on Aug. 14—May Be Voted Upon in November

The ordinance for unification of the railway companies and the construction of subways in Chicago was approved by the local transportation committee of the City Council on Aug. 5 and submitted to the Council on the same day. It will come up for passage on Aug. 14.

TRUSTEES NAMED

The measure as finally drafted had only a few minor changes aside from those mentioned in the account of the proceedings in last week's issue of the ELECTRIC RAILWAY JOURNAL. Interest centered on the names of men proposed by the companies for members of the board of trustees. There seemed to be general satisfaction with the following selections, which are subject to approval by the City Council:

E. D. Hulbert, president of the Merchants Loan & Trust Company; Harrison B. Riley, president of the Chicago Title & Trust Company; George G. Tunnell, assistant to the president of the Atchison, Topeka & Santa Fe Railroad and trustee of the Chicago bureau of public efficiency; John F. Sinulski, president of the Northwestern Trust & Savings Bank; Joseph E. Otis, vice-president and acting president of the Central Trust Company of Illinois; John W. O'Leary, president of the Arthur J. O'Leary & Son Company; Henry A. Blair, chairman of the board of operation of the Chicago Surface Lines and president of the Chicago Railways; Leonard A. Busby, president of the Chicago Surface Lines and president of the Chicago Railways; Britton I. Budd, president of the Chicago Elevated Railways.

FOUR PRESENT DIRECTORS INCLUDED

Of the nine men proposed, the present directorates of the companies include Messrs. Busby, Blair, Budd and Riley. The trustees under the new ordinance must have no financial interest in the companies and will be entitled to annual salaries of \$5,000 each.

Several attempts were made to require additional elevated or subway construction in the first period, but the Aldermen stood firm against adding to the financial requirements.

While there is still some opposition to the measure on the part of radical municipal ownership advocates it is not expected that this will hinder its passage. The newspapers are almost a unit in calling for favorable action and it looks as though the people will vote on the ordinance next November.

San Francisco-Oakland Terminal Wage Award

Brief Review of Full Award of Board Appointed to Pass Upon Wages for Key Route Employees

The board of arbitration consisting of Paul A. Sinsheimer, chairman; George C. Kaufman for the men and John S. Drum for the company, which has been considering the wage controversy between the San Francisco-Oakland Terminal Railways (Key Route) and its employees, handed down its findings under date of July 3 and issued them on July 11. The award is signed by Messrs. Sinsheimer and Kaufman.

WAGES ONLY THING BEFORE BOARD

The only issue before the board was the wage to be paid to the men. The conditions of employment were established under a new agreement between the company and the men. The existing wage schedules and the proposed readjustments all contemplate a ten-hour day.

The company operates a system of street railways, fast interurban electric railways and ferry boats. Its street railways serve a number of municipalities fronting the shore of San Francisco Bay, in Alameda and Contra Costa counties, including the cities of Oakland, Alameda, Berkeley, Richmond, Hayward and Piedmont, and embracing a territory of approximately 300,000 population. Its ferry boats and electric trains operate between the city of San Francisco and the cities of Oakland, Berkeley and Piedmont. The entire system embraces within its scope the largest cities on San Francisco Bay, with a population of approximately 800,000 people. This railway property consists of two sections: the Oakland Traction Company, commonly known as the "Traction Division," embracing the street railway service; and the San Francisco-Oakland & San Jose Railway, commonly known as the "Key Division," embracing the fast electric train service to the piers and the ferry boats which connect with San Francisco.

On June 17, 1917, the carmen's union called the existing agreement into question and asked for a modification of its terms. These modifications were adjusted satisfactorily with the company, with the exception of the new wage proposals made by the men. It was thereupon agreed between the company and the union that the question of wages should go to arbitration. Accordingly, on Aug. 25, 1917, an agreement of arbitration was entered into between the company and the union.

THE ELEMENTS CONSIDERED

The agreement of arbitration required that in reaching its conclusions the board should consider the four following elements:

1. The value of the services rendered by the men.
2. The wages paid on traction and interurban lines in other communities.
3. The cost of living in Oakland and

the other East Bay cities, as compared with other communities.

4. The financial ability of the company, in view of its present income and growing operating costs, to pay an increased wage.

The board reached and announced its conclusions in a memorandum on Nov. 2, 1917. The complete and final report is now presented in compliance with the full requirements of the arbitration agreement, so that it may be made available as a detailed record for the purposes of the Railroad Commission of California.

The board says it was offered six alternatives as follows:

1. To adopt the theory of the social minimum.
2. To adjust the existing wages by adding thereto the measure of the increase in living costs.
3. To determine the wage scale by a comparison with street railway compensation in other cities throughout the United States.
4. To determine the wage scale by the schedules paid in other industries in Oakland, Alameda and Berkeley.
5. To adjust the wages of the men in respect to the earnings and profits of the company—the theory of the economic maximum.
6. To compute a series of wage schedules which should be reasonable *per se*.

THE BOARD'S CONCLUSIONS

It reviews at length the degree and balance of emphasis to be placed on these various alternatives.

In conclusion the board says:

"The railway has maintained a continuity of its service. It has suffered a loss of revenue which these rising costs have entailed. It has honorably joined with its employees to meet the question of wages. Company and union have united in an effort and desire to do and to receive equity. They have been willing to forego such powers as each might possess to seek its own advantage and have placed the issue so vital to both in the hands of a disinterested tribunal.

"This company, we believe, in doing equity, is entitled to equity. It has continued to transport the populations of San Francisco, Oakland, Alameda, Berkeley and Piedmont with the same excellence of service that has heretofore obtained.

"We submit these facts for the consideration of the tribunal which shall pass finally upon its prayer for financial relief.

"We may summarize what has here been said into the following general principles:

- "1. Wages are measurable only by their relation to the costs of life.
- "2. Wages adjusted by arbitration must be reasonable and equitable *per se*.

"3. Capital cannot successfully urge its right to pay less than a reasonable standard because of financial impairment. This would mean that each purchaser could adjust prices to his financial means.

"4. If the sum available to capital and labor be limited, capital may wait for its return and still live. Labor cannot.

"5. It is manifestly inconsistent in industry to increase prices because wages are high and then, maintaining the prices, to withhold the wages.

"6. During a period of suddenly advancing costs, the public utility enterprise lacks the freedom of self-adjustment to the new condition that attaches to industry generally.

"7. In the public utility service, when rising costs and increased wages transgress on capital, either relief must be found in augmented earnings or the burden will continue to rest on capital.

"8. In the public utility service, the inter-dependence of the wages of the employee, the capital of the stockholder and the service to the patron demands a form of adjustment which shall assure equity to the wage earner and the stockholder and continuity of service to the patron.

"This brings us to the determination of the new schedule of wages in this enterprise. We have suggested a basic wage average from 40 cents to 42 cents an hour for the experienced men in the Traction Division. For the men in the Key Division, we recommend a scale graded from 43 cents to 45 cents an hour. Every man in this division will, however, by reason of his length of service, receive the maximum of 45 cents an hour. We, accordingly, find the following schedule of wages to be reasonable, as a minimum:

	Pay Per Hour
Traction Division	
First six months.....	30 cents
Second six months.....	32 "
First six months of second year.....	34 "
Second six months of second year.....	36 "
Third year.....	38 "
Fourth year.....	40 "
Fifth year and thereafter.....	42 "
Key Division	
First year.....	43 "
Second year.....	44 "
Third year and thereafter.....	45 "

"Brakemen of the Key Division will take the same wage rating as motor-men and conductors of the Traction Division.

Eastern Wisconsin Company Celebrates

The biggest patriotic celebration ever held in Winnebago County took place on July 14, Bastille Day, at Eweco Park, owned by the Eastern Wisconsin Electric Company, Oshkosh, Wis. Arrangements were made for a company of Wisconsin State Guards to be present. They formed a hollow square at the foot of the flagpole and when the salute was fired and the band struck up the national anthem a 12-ft. x 20-ft American flag was hoisted to the top of an 85-ft. flagpole on the shore of Lake Winnebago. The flag was then lowered and the flag of the French Republic was attached below

the American flag. This was followed by a salute, the band then struck up the national anthem of France, and the American flag and the French flag were hoisted up. Following this the two flags were lowered and the service flag of the Eastern Wisconsin Electric Company with thirty-three stars was attached below the French flag. The salute was again fired and the three flags were hoisted to the top of the pole, the band playing "On Wisconsin," the State song. More than 9000 people witnessed the ceremonies. Ten per cent of the receipts of the park division for that day were given to the Red Cross and the Knights of Columbus War Relief Funds. B. W. Arnold, manager of the company, received many compliments on the handling of the crowds by the company.

Successful Appeal for Men

The Rhode Island Company, Providence, R. I., has recently advertised as follows in the Providence papers:

"MEN IN NON-ESSENTIAL INDUSTRIES"

"The electric railways of the country are absolutely essential to winning the war. At the present time there is a shortage of men. The Rhode Island Company has many openings for men as conductors and motormen. Good wages are being paid and steady work guaranteed. Men in non-essential lines are asked to get into communication with our transportation department. This is your chance if the business in which you are engaged is not necessary to the winning of the war. Write or call on Mr. Hackett, Room 307, 100 Fountain Street, Providence. Hours 10 to 12 a.m., 2 to 5 p.m."

The results obtained are said to have been very satisfactory, and would seem to indicate that the appeal for men is one that might be employed profitably by electric railways elsewhere.

News Notes

Increase in Pay on Interurban Railway.—A new wage scale has been put into effect by the Interurban Railway, Des Moines, Iowa, which gives the men an average increase of about 35 per cent. The increase is retroactive and all employees will receive back pay from June 1.

San Francisco Men Accept.—The platform men of the San Francisco (Cal.) Municipal Railway have accepted the compromise wage proposition of the Board of Works and will receive 50 cents an hour for an eight-hour day, with time and a half after the first twenty minutes of overtime has elapsed.

Wages Increased in Fargo.—The wages of the trainmen of the Northern States Power Company, at Fargo, N. D., have been increased to the following scale: first six months, 26 cents an hour; second six months, 27 cents; third six months, 28 cents; fourth six months, 29 cents; after twenty-four months, 30 cents. On Jan. 1, 1917, an increase of 1 cent an hour was made and on Nov. 16, 1917, a further increase of 2½ cents was made. The total increase since Jan. 1, 1917, amounts to 6 cents an hour, or 25 per cent.

Get-Together Meetings.—In a statement to the employees of the Pacific Electric Railway, Los Angeles, Cal., in the *Pacific Electric Railway Magazine* for July 10, Paul Shoup, president of the company, suggests department family meetings at least once a month, to be attended by all the employees and officers to talk over all matters of common interest. Mr. Shoup says that he would be glad to attend the meetings if he were invited. He says: "Let's have no more bars between the company management and the rest of the people who are on the payroll."

Change in Pooling Plan Ratified.—The Board of Estimate of New York City on Aug. 2 ratified the plan by which the city will begin to share in new subway earnings on Jan. 1, instead of about three months later. This will result from a modification of the pooling arrangement. The amended plan was agreed upon several days ago by city officials, members of the Public Service Commission and the officers of the Interborough Rapid Transit Company. The proposed change in the pooling arrangement was referred to in this paper for Aug. 3, page 206.

Denver Wage Demands Before Board.—The wage committee of the union formed among the employees of the Denver Tramway have sent demands to the War Labor Board at Washington for an increase to 50 cents minimum and 55 cents maximum with a basic eight-hour day. Following this action a conference was held with the management. The men were not ready to present the demands so only preliminary discussion took place. No feeling of animosity exists between the men and the company and the trainmen continue to show the same spirit of courtesy and co-operation to the public.

Wages and Fares Coupled.—A local of the Amalgamated Association has just been organized among the employees of the Louisville (Ky.) Railway. Superintendent Riddle of the company addressed the union men at a meeting on July 30, in which he delivered a message from President Minary relative to the increased cost of materials, supplies, etc., and the need of a 6-cent fare. Mr. Minary urged the men to aid in the movement to obtain an increase in fare, a subject which will be taken up with the city administration at once. Mr. Riddle stated that increased wages were only possible in event a 6-cent fare was obtained.

Increase in Wages in San Francisco.—The third voluntary increase within one year in the wage scale for platform men was announced on July 27 by the United Railroads, San Francisco, Cal., to become effective on July 28. The increase affects 2200 employees. Under the new scale all the platform men getting less than 36 cents an hour receive a 4-cent raise for each hour's work. Those receiving 36 cents an hour and over get a 3-cent raise an hour, up to 45 cents, which is the new maximum. This is to be increased 1 cent an hour each year for those receiving under 45 cents an hour until they reach the maximum. For new men entering the service of the company this will be the wage scale: 37 cents an hour for the first six months, 39 cents an hour for the second six months, 40 cents an hour for the second year and 1 cent an hour for each year thereafter until the maximum of 45 cents an hour is reached.

Service Withdrawn Following Confusion.—Because it believed that a continuance of the shuttle service connecting the lines of the H subway system at Times Square and the Grand Central Station, New York, would prove a peril under the present uncompleted condition of these stations and until the public has learned the new routes, it was decided by the Public Service Commission on Aug. 2 to stop this service temporarily at midnight that day. It was made clear that the plans of the subway, as originally made, were not affected by the stopping of this short-line service, but that it was a mistake to try to give complete service at the present time. Construction work at Times Square station and at the Grand Central station will be rushed, and when the dead tracks and the temporary platforms at the Grand Central are removed and the passageways shortened at the Times Square station the shuttle service will be resumed.

Effect of War Board Ruling on Chicago Companies.—Raising of the wages of trainmen approximately 9 cents an hour by mandate of the War Labor Board brought to the people of Chicago a realization of the fact that higher fares will be necessary to meet the additional cost of operation. To the Chicago Surface Lines the new wage scale means about \$3,500,000 added to the payrolls, while the elevated companies' burden will be close to \$1,500,000. The traveling public had heard of the provisions of the pending ordinance which would put rates of fare on a sliding scale to meet the cost of service, but many persons evidently had not figured that higher fares would ever be necessary. The railway officials have not announced any definite program of action looking to extra revenues, but they have informed the public that increases in the prevailing rates are inevitable. The Surface Lines probably will ask the city authorities to agree to an amendment in the present ordinance so that fares can be raised. The elevated lines will probably seek relief from the State Utilities Commission.

Financial and Corporate

Net Lags Behind Gross

Subsidiaries of United Light & Railways Company Feel Effects of Rising Costs

The gross earnings of the subsidiaries of the United Light & Railways Company, Grand Rapids, Mich., for the calendar year 1917 showed substantial increases in all departments. Owing to the higher cost of materials and labor and the increased taxes, however, the net earnings did not show a proportionate increase.

PASSENGER DECREASE OF 15.16 PER CENT

The revenue passengers of the railway subsidiaries totaled 43,777,903, an increase of 5,764,828 or 15.16 per cent. The sources of revenue of the subsidiary companies, both gross and net, and the percentage of each class of revenue to the total, are shown in Table I.

TABLE I—DIVISION OF GROSS AND NET EARNINGS OF SUBSIDIARIES OF UNITED LIGHT & RAILWAYS COMPANY FOR CALENDAR YEARS 1916 AND 1917

Gross Earnings:		Per Cent of Total		Per Cent of Total	
	1917		1916		
Gas.....	\$1,539,844	19.99	\$1,353,805	19.66	
Residuals....	126,787	1.65	92,709	1.35	
Electric.....	7,786,411	36.13	2,587,459	37.58	
Railway—City....	2,090,648	27.14	1,806,218	26.23	
Railway—Interurban	910,322	11.82	868,601	12.61	
Heat.....	121,365	1.58	56,215	0.82	
Miscellaneous....	129,885	1.69	90,770	1.32	
Total.....	\$7,705,268	100.00	6,885,779	100.00	
Net Earnings:					
Gas.....	\$481,588	18.12	\$564,160	21.16	
Electric.....	1,054,814	39.68	1,152,546	43.22	
Railway—City....	737,668	27.75	571,968	21.45	
Railway—Interurban	254,726	10.71	300,693	11.28	
Heat.....	303	0.01	10,745	0.40	
Miscellaneous....	99,259	3.73	66,280	2.49	
Total....	\$2,658,361	100.00	\$2,666,393	100.00	

During 1917 a total of \$1,903,053 was expended for additions and extensions to properties. Of this total \$220,990 was expended on gas properties, \$779,282 on electric properties, \$817,303 on railway properties and \$85,476 on heating properties.

Expenditures for construction were general in nature and became necessary because of the growth of the communities served. A large proportion of the above-mentioned sum was expended on the properties of the Tri-City Railway & Light Company, serving Davenport, Iowa, and Rock Island, Moline and East Moline, Ill. The expenditures there were made to satisfy the requirements of the United States Government and industries employed on important government contracts.

The comparative statement of the holding company and the subsidiaries for 1916 and 1917 is given in Table II. From the surplus accounts of subsidiary

companies, \$309,161 was transferred to their depreciation reserves, and in addition the subsidiary companies expended or set aside for maintenance

TABLE II—COMPARATIVE INCOME STATEMENT OF UNITED LIGHT & RAILWAYS COMPANY AND SUBSIDIARIES FOR CALENDAR YEARS 1916 AND 1917

	1917	1916
*Gross Earnings, (all sources).....	\$7,853,909	\$6,922,559
*Operating Expenses (including maintenance, general, income and excess profit taxes).....	5,046,907	4,219,386
Net Earnings.....	\$2,807,002	\$2,703,173
Interest on subsidiary securities held by public.....	899,381	931,260
Balance.....	\$1,907,621	\$1,771,913
Interest on first and refunding 5 per cent bonds, United Light & Railways Company.....	434,302	403,724
Balance.....	\$1,473,319	\$1,368,189
Interest on debenture, notes and loans of United Light & Railways Company.....	268,748	174,916
Balance available for dividends.....	\$1,204,571	\$1,193,273
Dividends, first preferred stock, 6 per cent.....	605,557	595,793
Surplus Earnings.....	\$599,014	\$597,480

*The gross earnings and operating expenses of the subsidiary companies include inter-company transactions to the amount of \$925,110, of which \$256,522 represents electric power sold to subsidiary railway properties.

\$521,065, which was charged directly to operating expenses. This made the total expended or set aside for maintenance and depreciation of property \$830,226, or over 12.88 per cent of the gross earnings received from the sale of gas, electricity, heat, and transportation. In compliance with the depreciation fund agreement with bondholders, there was expended in 1917 the further sum of \$246,342 for extensions, betterments and additions, against which no bonds can be certified.

The operating expenses of the subsidiary companies covered \$395,460 incurred for payment of general and federal taxes, including excess profit taxes, an increase of \$100,028 for the year.

New Cities Service Issue

Henry L. Doherty & Company and Montgomery & Company have formed a syndicate to underwrite \$6,000,000 convertible 7 per cent gold debenture bonds of the Cities Service Company which are to be offered to stockholders for subscription at 102½. The bonds are part of an authorized issue of \$30,000,000, of which \$3,000,000 were disposed of last March. The proceeds of the new offering are to be used in developing oil land holdings.

After Jan. 1, 1920, the bonds will be convertible into Cities Service stock in proportion of 80 per cent of preferred and 20 per cent of common for each \$100 par value of bonds.

Against Finance Plan

Attorney General Is Opposed to Proposed Utility Finance Corporation

The Attorney General has reported adversely on the plan for a \$100,000,000 corporation to act as an intermediary between borrowing corporations and the War Finance Corporation. This was disclosed on Aug. 2 by W. P. G. Harding, governor of the Federal Reserve Board and managing director of the War Finance Corporation, following an informal conference with New York bankers at the Federal Reserve Bank. Mr. Harding, before taking the train for Washington, said:

PLAN ORIGINATED IN NEW YORK

"The plan originated by New York bankers and strongly supported by Chicago bankers appeared to be faulty and Attorney-General Gregory was asked for a ruling. He decided that section 10 of the war finance act, limiting loans to any one corporation to 10 per cent of the War Finance Corporation's capital, or \$50,000,000, applied to the corporation proposed as an intermediary. In consequence the utmost amount that such a corporation could receive from the War Finance Corporation is \$50,000,000."

The New York Sun says that when Governor Harding's announcement was reported to a banker intimately connected with the plans to form a \$100,000,000 buffer corporation, he said:

"That settles it. Our plans are knocked in the head. Some new method will have to be devised or the borrowings of corporations will be sadly limited. We had hoped to aid not only public utilities but all corporations in need of assistance."

"The banks are well loaned up. They would not care to indorse or guarantee the obligations generally of debtor corporations, and the War Finance Corporation finds it difficult to make loans on the collateral without some guarantee. If the War Finance Corporation could loan a much larger amount than \$50,000,000 to our proposed intermediary concern, the problem could have been easily solved, but such a ruling puts an end to a scheme that received strong support and was carefully studied."

\$100,000,000 CORPORATION PROPOSED

The War Finance & Utilities Corporation, organization of which awaited a favorable ruling from the Attorney General, was to have been a \$100,000,000 corporation at the start with plans for further enlargement. It was being formed under section 7 of the War Finance Corporation act, which provides in brief that a bank or banking establishment may make loans to any business which is necessary or contributory to the prosecution of the war and may rediscount 75 per cent of every such loan at the offices of the War Finance Corporation. The limitation to \$50,000,000 affects the extent of rediscounts and loans combined.

Cleveland Railway Shows Deficit for 1917

Traffic Increase of 1916 Not Maintained Last Year, with Rising Taxes and Expenses

Two of the most important incidents of operation for the Cleveland (Ohio) Railway during the calendar year 1917 were the increases in the operating allowance and in the rate of fare. An increase in the operating expense allowance to 14½ cents per revenue car-mile became effective on Jan. 1 and continued during the whole year, instead of 13½ cents, the allowance in effect from May 1, 1916, to the end of that year. On Dec. 15 the rate of fare was changed from rate "e" (3 cents cash fare, plus 1 cent for a transfer) to rate "d" (4 cents cash fare, three tickets for 10 cents, 1 cent transfer and 1 cent rebate), and, on Dec. 26, to rate "c" (4 cents cash fare, three tickets for 10 cents, 1 cent transfer, no rebate).

The company was aided in keeping down the fare in 1916 by an increase of something like 12 per cent in business, with an increase of only 5 per cent in car mileage. During 1917, however, the receipts from April on began to fall. The increase for the first ten months was less than 7 per cent and for November only 4 per cent over 1916. At the same time taxes increased 10.9

per cent, and the expenses of maintenance and operation rose 13.44 per cent in the first ten months.

During 1917 the operating revenues increased \$654,570 or 6.87 per cent, the gain in passenger revenue being 7.04 per cent. Revenue from other operations rose \$13,496 or 14.44 per cent, and non-operating income \$4,638 or 6.12 per cent. On the other hand, the total maintenance and operating expenses increased \$901,905 or 13.54 per cent. The largest items of increase were in the following accounts: Wages of trainmen, \$241,777; injuries and damages, \$169,350; fuel for power, \$93,303, and power purchased, \$185,250.

The accident department estimates that more than \$600,000 will be required to settle claims unadjusted at the close of the year arising from accidents that happened between March 1, 1910, and Jan. 1, 1918. There is no balance in the operating expense reserve, or in any other reserve, to meet these liabilities.

The car-mile earnings and expenses of the company for the last two calendar years are given in the accompanying statement. The total revenue

car-miles increased from 35,673,567 to 37,648,670, and the ordinance car-miles (with trailers at 60 per cent) from 33,-871,076 to 35,822,584. The total rides increased from 375,382,748 to 398,378,-894. The percentage increases during 1917 in these and other items are shown below:

	Per Cent Increase in 1917 Over 1916
Passenger revenue (exclusive of transfers)...	7.69
Passenger revenue (including transfers)....	7.04
Gross income.....	6.87
Maintenance allowance.....	5.77
Maintenance expenses.....	7.71
Operating allowance.....	15.62
Operating expenses.....	15.88
Taxes.....	10.99
Interest.....	.84
Operating expenses, taxes and interest.....	11.51
Total expenses, taxes and interest.....	10.73
Fares.....	6.86
Transfers.....	3.50
Rides.....	6.13
Ordinance car-miles.....	5.76
Actual car-miles.....	5.54
Allowances, taxes and interest.....	10.23
Expenses, obsolete equipment, taxes and interest.....	11.76

On Dec. 31, 1917, the interest fund was \$273,963 less than the amount originally provided under the terms of the Tayler ordinance. The earnings in excess of allowances, taxes and interest totaled \$463,173 for 1910, 1912, 1915 and 1916, but the losses in 1911, 1913, 1914 and 1917 showed the preponderating total of \$737,136, leaving the net decrease noted above. The balance in the fund on Jan. 1, 1917, was \$545,438, and at the end of the year \$226,036. The maintenance reserve on Dec. 31, 1917, showed a deficit of \$298,624 as compared to \$268,918 the year before, and the operating reserve a deficit of \$216,281 as compared to \$195,075. Besides these deficits, aggregating \$514,-905, there were various suspense accounts bringing the total reserve and suspense accounts on Dec. 31 to \$2,-338,589.

The expenditures on betterment or construction accounts in 1917 amounted to \$1,219,715, the largest items being for the new track extensions, a new transformer station and its equipment, new motor-cars and trailers, and land. In line with the general policy of the nation, expenditures for track extensions and other new property will probably be held down as closely as possible in the current year.

I. R. T. Financing Discussed

W. P. G. Harding, governor of the Federal Reserve Board and managing director of the War Finance Corporation, on Aug. 2 called on Mayor Hylan and Comptroller Craig with reference to the proposed Interborough Rapid Transit Company financing and reported that he had obtained from them full information regarding the relations between the city and Interborough Rapid Transit Company and the Brooklyn Rapid Transit Company. He said:

"I took advantage of this trip to New York to ascertain from the municipal authorities the terms on which the companies operate the lines owned by the

COMPARATIVE INCOME STATEMENT OF CLEVELAND RAILWAY FOR CALENDAR YEARS 1916 AND 1917

I—Based on Ordinance Allowances					
	1917		1916		
	Amount	Cents Per Car-Mile	Amount	Cents Per Car-Mile	
Operating revenues:					
Revenue from transportation.....	\$10,069,164	.....	\$9,428,091	.....
Revenue from other operations.....	106,961	.....	93,464	.....
Total operating revenues.....	\$10,176,125	28.41	\$9,521,555	28.11	
Expense allowances:					
Maintenance.....	\$1,770,074	4.94	\$1,623,548	4.94	
Operating.....	5,194,275	14.50	4,492,732	13.27	
Total expense allowances.....	\$6,964,349	19.44	\$6,166,280	18.21	
Net operating revenue.....	\$3,211,776	8.97	\$3,355,275	9.90	
Non-operating income.....	80,388	0.22	75,750	0.22	
Gross income.....	\$3,292,165	9.19	\$3,431,025	10.12	
Taxes.....	643,107	1.80	579,423	1.71	
Net income.....	\$2,649,057	7.39	\$2,851,602	8.41	
Interest.....	1,928,856	5.38	1,912,815	5.65	
Surplus.....	\$720,200	2.01	\$938,787	2.76	
Special allowances.....	1,039,602	2.90	936,000	2.76	
Net surplus.....	*\$319,401	0.89	\$2,787	0.00	
II—Based on Actual Expenses					
Operating revenues.....	\$10,176,125	28.41	\$9,521,555	28.11	
Actual expenses:					
Maintenance of way and structures.....	\$1,089,883	3.04	1,062,379	3.14	
Maintenance of equipment except power plant.....	946,604	2.64	808,060	2.38	
Maintenance of power plant.....	32,211	0.09	49,254	0.15	
Total maintenance.....	\$2,068,698	5.77	\$1,919,693	5.67	
Power.....	\$1,094,942	3.06	\$811,594	2.40	
Conducting transportation.....	3,120,295	8.71	2,824,852	8.34	
Traffic.....	500	0.00	500	0.00	
General and miscellaneous.....	1,277,902	3.57	1,103,793	3.26	
Total operating.....	\$5,493,639	15.34	\$4,740,739	14.00	
Total expenses.....	\$7,562,338	21.11	\$6,560,433	19.67	
Net operating revenue.....	\$2,613,787	7.30	\$2,861,122	8.44	
Non-operating income.....	80,389	0.22	75,751	0.22	
Gross income.....	\$2,694,176	7.52	\$2,936,873	8.66	
Taxes.....	643,109	1.79	579,423	1.71	
Net income.....	\$2,051,068	5.73	\$2,357,450	6.95	
Interest.....	1,928,856	5.38	1,912,815	5.65	
Surplus.....	\$122,212	0.34	\$444,635	1.30	
Obsolete property.....	524,000	1.46	384,000	1.13	
Net surplus.....	*\$401,788	1.12	\$60,635	0.17	
*Deficit.					

city, and Mayor Hylan gave me all the information I required. The Interborough company had an application before the War Finance Corporation for a direct loan, but this was subsequently withdrawn. I have received intimation that a fresh application is about to be made and I secured firsthand information regarding the company's financing problems."

The Public Service Commission has granted the application of the Interborough Rapid Transit Company to issue \$39,416,000 of 7 per cent notes at not less than 95½ of their face value convertible into 5 per cent bonds at 87½.

W. S. S. Campaign at Wheeling

To assist Wheeling "over the top" in the recent national campaign for the sale of War Saving Stamps, the employees of the Wheeling Traction Company formed an organization known as the Wheeling Traction System War Savings Society. The organization dedicated the first of the fifty-two new cars being delivered to the Wheeling Traction Company by using it as a meeting hall at the time of the formation of the society and as a means of transport for the campaign workers. Their first meeting was addressed by the Highlander Sandy MacGregor of Tank Britannica fame. The employees of every department of the company belong to the organization. The society secured subscriptions for \$9,010, or about \$22 per man employed. This sum was secured notwithstanding the fact that many of the employees are members of other war saving clubs. To stimulate interest and show the progress of the campaign a great clock diagram was painted on the bulletin board on the front of the Highland carhouse of the company. As this carhouse faces the National Pike over which army trucks are passing at the present time at the rate of 500 per week, the board attracted considerable attention.

Financial News Notes

\$5,000,000 Mortgage Recorded.—The Sacramento Northern Railroad, the successor to the Northern Electric

Railroad, Chico, Cal., has filed for record a \$5,000,000 mortgage in favor of the Mercantile Trust Company, San Francisco, Cal. This is in accordance with the plan for the reorganization of the Northern Electric Railroad following foreclosure and sale recently. The reorganization plan was reviewed in the ELECTRIC RAILWAY JOURNAL for June 15, page 1161.

Municipal Line Sold for Junk.—At a special meeting of the Council of Yazoo City, Miss., on July 16 the Municipal Railway, abandoned about three months ago on account of the expense of operation exceeding the income, was sold to the highest bidder, Ben Goldstein, Yazoo City, for \$20,000. Mr. Goldstein gets the entire equipment, except the engines and generating outfit at the power house, which will be sold as a separate outfit. The purchaser has a year in which to dismantle the property.

\$1,000,000 Bond Issue Authorized.—Chairman Hill of the Public Service Commission for the Second District of New York has heard the application of the Syracuse & Suburban Railroad, Syracuse, N. Y., for permission to make a first refunding mortgage on all the company's property for \$1,000,000, and for authority to issue \$750,000 of fifty-year 5 per cent bonds. The proceeds of the bonds are to be used in purchasing outstanding bonds and for reimbursing the company's treasury for capital expenditures made and under contemplation.

Winnipeg Net Income Drops.—The net income (excluding depreciation) of the Winnipeg (Man.) Electric Railway for the year ended Dec. 31, 1917, at \$253,629 showed a decrease of \$151,621 as compared to 1916, although the gross earnings at \$3,339,009 represented a gain of \$27,840. In commenting upon this showing the company says that so long as materials continue to rise in price, demands for higher wages have to be met and the jitney question remains unsettled, no substantial improvement in net income can be expected. The company provided \$201,050 for depreciation and \$60,000 for a sinking fund appropriation in 1917, and the surplus carried forward amounted to \$1,218,106.

Lincoln Traction Removes Track.—Some years ago two electric railways operated at Lincoln, Neb.—the Lincoln Traction Company and the Citizens' Railway. Both companies operated a line between Lincoln and College View,

one line being 6¼ miles long on direct private right-of-way with a running time of twenty-four minutes, while the other was 7 miles long with a running time of forty minutes. Since the Lincoln Traction Company took over the Citizens' Railway the operation of the two lines has been continued, but on July 13 the Public Service Commission gave permission for the removal of 1 mile of track between Normal and College View. In order to avoid any delay laborers were put to work on Sunday morning, July 14, and the offending track was removed forthwith.

Enforced Service Unsatisfactory.—On Aug. 2 J. S. Lewis, president of the Southern Traction Company, Bowling Green, Ky., was arrested for maintaining a nuisance in the form of a street railway. The warrant followed complaints registered by citizens relative to the operation of the cars and to the condition of the plant of the company. Some months ago the officers and stockholders of the company endeavored to dispose of the property as junk to a St. Louis Company, which announced its intention of dismantling the road. A temporary injunction prevented this. Later a permanent order was entered prohibiting the company from dismantling the plant and selling the equipment. Under the terms of the franchise the city held that the company would have to give service. The enforced service proved unsatisfactory.

Supplementary Receivership Bills.—Ephrim Caplin, attorney for John W. Seaman, New York, in receivership proceedings against the United Railways, St. Louis, Mo., on July 27, filed in the United States District Court a petition supplementary to the two bills previously filed in the proceedings, and naming six local members of the board of directors as defendants. As in the preceding petitions, the supplementary bill asks that the directors be ousted. Those named additionally are A. C. Brown, Murray Carleton, A. J. Siegel, A. L. Shapleigh, F. O. Watts and D. R. Francis, Jr. These six names were left off the other petitions because of there being no judge in the city who could give this permission. The new petition also includes a request that a special master be appointed to call a special meeting of the stockholders for the election of new directors. The petition would debar from the election the directors just mentioned because of their alleged complicity in deeds affecting the company adversely.

Electric Railway Monthly Earnings

NORTHERN OHIO TRACTION & LIGHT COMPANY, AKRON, OHIO

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
12 m. June, '18	\$6,750,454	\$4,339,549	3,410,905	\$1,047,182	\$1,363,723
12 m. June, '17	5,864,694	3,389,806	2,475,682	953,141	1,522,547

TWIN CITY RAPID TRANSIT COMPANY, MINNEAPOLIS, MINN.

	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1 m. June, '18	\$980,431	\$542,769	\$437,662	\$155,612	\$110,050
1 m. June, '17	853,195	542,258	310,937	145,398	165,539
6 m. June, '18	4,847,573	3,515,491	1,332,082	918,080	394,002
6 m. June, '17	5,175,944	3,408,072	1,767,872	676,011	891,861

* Includes Tanka. † Deficit.

PADUCAH TRACTION & LIGHT COMPANY, PADUCAH, KY.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1 m. May, '18	\$24,216	\$17,106	\$7,112	\$8,073	\$1361
1 m. May, '17	23,265	18,202	5,063	7,472	12,409
12 m. May, '18	303,014	226,940	76,074	93,976	15,902
12 m. May, '17	310,441	231,374	79,067	86,779	17,712

PENSACOLA (FLA.) ELECTRIC COMPANY

	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1 m. May, '18	\$38,606	\$25,996	\$12,610	\$8,131	\$4,478
1 m. May, '17	25,313	15,644	9,669	7,801	1,869
12 m. May, '18	404,933	249,282	155,650	94,973	60,677
12 m. May, '17	291,567	170,102	121,465	92,990	28,495

Traffic and Transportation

New York Inquiry Begun

City Commission Asks Surface Railways for Data to Permit Inquiry into Their General Condition

The Public Service Commission for the first District of New York, on Aug. 7, began an investigation into the general condition of all street surface railroad corporations operating cars within the city of New York.

OBJECT OF INVESTIGATION STATED

Chairman Hubbell presided, and Commissioners Travis H. Whitney, Charles S. Hervey, F. J. H. Kracke and Samuel H. Ordway were present. Chairman Hubbell opened the hearing. He stated that the object of the investigation was to ascertain actual conditions upon surface car lines, and to determine whether the service afforded is adequate and proper for the war period.

Commissioner Charles S. Hervey, upon whose motion the investigation was ordered, suggested the appointment of a conference committee on service, to report at the next hearing, consisting of one member each from the New York Railways, the Third Avenue Railway, the Brooklyn Rapid Transit surface lines, the Queens Borough surface lines and the Richmond Borough surface lines, together with a representative each from the transit bureau, the bureau of electrical equipment, the bureau of statistics and accounts, the transit division of the secretary's office and the law department of the commission, such conference committee to report as follows:

1. What lines largely used by the public are now applying inadequate service, and what additional service thereon is necessary to meet the public need?
2. What, if any, surface lines in the city can be discontinued during the period of the war, without serious inconvenience to the public?
3. Where service cannot be discontinued, what reduction in non-rush hour service can be made?
4. If any discontinuance of service or reduction in service is recommended, what will be the annual or monthly saving thereby, expressed in quantity of material or labor and in money:

- (a) in the consumption of coal,
- (b) in the release of labor to other lines,
- (c) in the release of cars to other lines,
- (d) in the general overhead of operation and in the maintenance of property in the streets,
- (e) in the release of property which can be taken wholly out of service.

STATISTICAL DATA REQUESTED

In reporting on any of these proposed discontinuances or reduction of service, the committee is to furnish full information as to the use of these lines, the number of passengers carried, the number of cars operated, the passenger revenue and operating costs, etc., for a full year preceding July 1, 1918.

With respect to statistical data re-

quired, the companies are requested to prepare for submission at the next session, for all property under their jurisdiction in public use, either owned or leased, full information for each year of the period beginning July 1, 1909, and ended June 30, 1918, including the following:

1. Revenues and expenses, including taxes,
2. Disbursements for interest, dividends or rentals.
3. Value of property in public use, owned or rented, as reported by the companies to the departments of taxation.
4. Amortization or depreciation reserves.

Commissioner Whitney advised the preparation of these additional data:

On the basis of adequate service, give the following costs by months, from Aug. 1, 1918, to Aug. 1, 1919:

1. Wages of platform employees.
2. Wages of employees necessary to maintain property in safe and efficient condition.
3. Cost of material necessary for such maintenance.
4. Other costs necessary for such operation and maintenance.

In each case the companies are asked to furnish such wages and costs on the following bases: (1) Wages and costs in 1915, (2) wages and costs as of Aug. 1, 1918, (3) wages and costs necessary to maintain the property and operate adequate service.

In basing the estimates on adequate service the companies are also to give by months the total car-miles to be operated and the estimated passengers.

The hearing was adjourned one week.

Jersey Company Renews Appeal

The Public Service Railway, Newark, N. J., on Aug. 6 made another application to the Board of Public Utility Commissioners for an increase in fare to 7 cents on all the company's lines, urging that because of the War Board's decision allowing an increase in wages to employees the increased fare is an absolute necessity. Counsel said that another reason for the application was that the company might accumulate a surplus to maintain its credits. The War Board's order compelling an increase in wages, he said, would cause an expenditure in that direction by the company between now and Dec. 31 next of \$877,571.

Vice-President Slocum, of the utility board, said that the application would throw the doors wide open again on the matter. The board will fix a date for a hearing.

The original application of the company to the commission was for an increase in fare from 5 cents to 7 cents and to charge 2 cents on an original transfer and another cent on a transfer on a transfer. On July 12 the board issued an order allowing the company to charge 1 cent for each original transfer on each fare starting Aug. 1.

Five Cents for Cleveland

Company Will Also Charge for Transfers—Tayler Grant Provisions Revised for War Period

..Cleveland now has a straight 5-cent fare, with a 1-cent charge for transfers without rebate. The ordinance increasing the rate of fare from 4 cents, or seven tickets for a quarter, with 1 cent for a transfer, was passed at a special session of the City Council on Aug. 3. The session was called by Mayor Harry L. Davis immediately after the receipt of information that the conductors and motormen had been granted a substantial advance in wages by the Federal War Labor Board.

FIVE FARE SCHEDULES FIXED

The new ordinance fixes five fare schedules. Unlike the Tayler plan, the first is the highest. For the present, however, it was considered sufficient to put the second one into force. The first calls for a maximum cash fare of 6 cents, 1 cent for a transfer and no rebate. As a matter of fact all five schedules provide for this transfer charge without rebate. The schedules are as follows:

1. Six cents cash fare, nine tickets for 50 cents.
2. Five cents cash fare, five tickets for a quarter.
3. Five cents cash fare, eleven tickets for 50 cents
4. Five cents cash fare, six tickets for a quarter.
5. Four cents cash fare, five tickets for 20 cents.

This ordinance also provides for an increase from 16 cents per car-mile to 19½ cents per car-mile in the operating allowance. The increase will date from May 1, the date when the advance in wages takes effect. The City Council urged that all back pay due the men under the increase be paid up by Aug. 15, but the company doubts its ability to complete the payment of the accumulated wages before Oct. 1 without borrowing money for that purpose.

The ordinance dates from Aug. 4 and will be in effect until six months after the close of the war, when the schedules of the Tayler ordinance again become operative.

The finding of the Federal War Labor Board, in the case of the men in Cleveland was referred to in the *ELECTRIC RAILWAY JOURNAL* for Aug. 3, page 207.

WAGE AWARD WILL COST \$1,500,000

It is estimated that the award will result in an increase of between \$1,250,000 and \$1,500,000 a year in wages. As the old wage scale meant the payment of about \$2,500,000 a year, wage requirements will be increased to almost \$4,000,000.

Local fares in Lakewood and Cleveland Heights will remain as they are, but no transfers will be issued. Fares for those places for passengers going in or out of the city will be 5 cents, the same as within the city limits of Cleveland.

Many Railways Increase Fares

Statistics Published by the American Electric Railway Association Give Data Since the Last Report

The statistical department of the American Electric Railway Association has compiled a list of electric railway companies whose fares have recently been increased. It is supplementary to the list issued by the association during the first part of the year and mentioned on page 541 of the issue of this paper for March 16. Roughly, the period covered is from February to the middle of July. The list follows:

CITY RAILWAYS

Arkansas

Hot Springs (Hot Springs Street Railway)—All reduced fares eliminated. Flat 5-cent fare in effect.

California

San Francisco district (San Francisco-Oakland Terminal Railways)—Trans-bay fare increased to 10 cents and 11 cents and commutation rate raised on parity with steam road rates. Permitted by Railroad Commission.

Delaware

Wilmington (Wilmington & Philadelphia Traction Company)—Former fare 5 cents, present fare 7 cents. Permitted by Public Utility Commissioner.

Iowa

Des Moines (Des Moines City Railway)—Reduced rates eliminated. Flat 5-cent fare in effect. Permitted by City Council.

Illinois

Bloomington, Cairo, Champaign, Danville, Decatur and other cities in Illinois (Illinois Traction System)—Reduced fares eliminated. Flat 5-cent fare in effect.

Elgin (Aurora, Elgin & Chicago Railroad)—Former fare 5 cents, present fare 6 cents.

Jacksonville (Illinois Traction System)—Former fare 5 cents, present fare 6 cents.

All permitted by Public Utilities Commission.

Indiana

Evansville (Public Utilities Company)—Reduced fares eliminated. Flat 5-cent fare in effect.

Jeffersonville and New Albany (Louisville & Southern Indiana Traction Company)—Reduced fares eliminated. Flat 5-cent fare in effect.

All permitted by Public Service Commission.

Kansas

Kansas City (Kansas City Railways)—Former fare 5 cents; present fare 6 cents. Permitted by Public Service Commission.

Kentucky

Paducah (Paducah Traction Company)—Former fare 5 cents, present fare 6 cents. Permitted by City Commission.

Massachusetts

Amherst, Greenfield and Northampton (Connecticut Valley Street Railway)—Reduced fares eliminated. Flat 5-cent fare in effect.

Boston, Suburbs (Middlesex & Boston Street Railway)—Former fare, 7 cents with 5-cent tickets, present fare 7 and 8 cents, with charge of 1 cent for transfer between 7 and 8-cent lines. Six-cent tickets abolished.

Holyoke (Holyoke Street Railway)—Fares increased through adoption of zone system.

Springfield (Springfield Street Railway)—Fares increased by adoption of zone system.

All permitted by Public Service Commission.

Michigan

Hatfield Creek and Jackson (Michigan United Railways)—Former fare, 5 cents; present fare, 6 cents. Permitted by City Commissioners.

Manistee (Manistee City Railway)—Former fare 5 cents, present fare 10 cents three tickets for 25 cents, seven tickets for 50 cents. Permitted by City Council.

Missouri

Kansas City (Kansas City Railways)—Former fare 5 cents, present fare 6 cents. St. Joseph (St. Joseph Railway, Light, Heat & Power Company)—Sale of tickets at six for 25 cents eliminated.

St. Louis (United Railways of St. Louis)—Former fare 5 cents, present fare 6 cents. All permitted by Public Service Commission.

New Hampshire

Claremont (Claremont Railway & Lighting Company)—Reduced rates eliminated. Flat 6-cent fare in effect.

Keene (Keene Electric Railway)—Former fare 6 cents, present fare 7 cents.

Manchester (Manchester Street Railway)—Former unit fare, 5 cents; present fare, 6 cents.

All permitted by Public Service Commission.

New Jersey

Atlantic City (Atlantic City & Shore Railroad)—Unit zone fares increased 1 cent, except that fare between Atlantic City and Pleasantville was increased 2 cents.

Newark and all other cities in New Jersey served by the company (Public Service Railway)—One-cent charge for transfer added to unit fare.

Ocean City (Ocean City Electric Railroad)—Former fare, 5 cents; present fare, 7 cents.

All permitted by Public Utilities Commission.

New Mexico

Albuquerque (City Electric Company)—Former fare, 5 cents; present fare, 6 cents. Permitted by City Commissioners.

New York

Geneva (Geneva, Seneca Falls & Auburn Railroad)—Former fare, 5 cents; present fare, 6 cents. Permitted by Public Service Commission.

Ogdensburg (Ogdensburg Street Railway)—Former fare, 5 cents; present fare, 7 cents. Permitted by Public Service Commission.

Ossining (Hudson River & Eastern Traction Company)—Former fare, 5 cents; present fare, 6 cents. Permitted by Village Trustees.

Peekskill (Peekskill Lighting & Railroad Company)—Former fare, 5 cents; present fare, 6 cents. Permitted by Village Trustees.

Poughkeepsie (Poughkeepsie City & Wappingers Falls Electric Railway)—Former fare, 5 cents; present fare, 6 cents. Permitted by Public Service Commission.

Waverly (Waverly, Sayre & Athens Traction Company)—Former fare, 5 cents; present fare, 6 cents. Permitted by Village Trustees.

White Plains (Westchester Street Railroad)—Former fare, 5 cents; present fare, 6 cents. Permitted by Common Council.

North Carolina

Asheville (Asheville Power & Light Company)—Reduced rates eliminated; flat 5-cent fare in effect.

Greensboro (North Carolina Public Service Company)—All reduced fares eliminated; flat 5-cent fare in effect.

Wilmington (Tidewater Power Company)—Former fare, 5 cents; present fare, 7 cents; fare to Wrightsville Beach increased from 35 to 40 cents. Permitted by State Corporation Commission.

Ohio

Cleveland (Cleveland Railway)—Fare increased to highest scale provided in franchise: 4-cent cash fare, 1 cent for transfer, no rebate; seven tickets for 25 cents.

Toledo (Toledo Railways & Light Company)—Former fare, 5 cents; present fare, 6 cents with 1 cent charge for transfer. Permitted by United States District Court. City restrained from interfering.

Oklahoma

Chickasha (Chickasha Street Railway)—Former fare, 5 cents; present fare, 6 cents. Permitted by State Corporation Commission.

Pennsylvania

Chester (Chester Traction Company)—Former fare, 5 cents; present fare, 6 cents. Lebanon suburban lines (Reading Transit & Light Company)—Former fare, 6 cents; present fare, 8 cents.

Mauch Chunk (Carbon Transit Company)—Former fare, 5 cents; present fare, 7 cents. Permitted by City Council for period of war and eighteen months thereafter.

Mount Carmel (Shamokin & Mount Carmel Transit Company)—Unit zone fares increased from 5 to 6 cents.

Norristown suburban lines (Reading Transit & Light Company)—Former fare, 6 cents; present fare, 8 cents.

Pittsburgh (Pittsburgh Railways)—Former fare, 6 cents and 6½ cents; present fare, 5 cents in central zone and 7 cents to points outside.

Suburban Pittsburgh (West Penn Railways)—Former fare, 5 cents; present fare, 6 cents.

Reading, suburban lines (Reading Transit & Light Company)—Former fare, 6 cents; present fare, 8 cents.

Rhode Island

Providence and other cities (Rhode Island Company)—Fares increased by introduction of zone system. Permitted by Public Utilities Commission.

South Dakota

Sioux Falls (Sioux Falls Traction Company)—Former fare, 5 cents; present fare, 6 cents. Permitted by referendum of voters.

Utah

Salt Lake City (Utah Light & Traction Company)—All reduced rates abolished; flat 5-cent fare in effect; suburban zones readjusted. Permitted by Public Utility Commission, contested by city and upheld by Supreme Court.

Virginia

Charlottesville (Charlottesville & Albemarle Railway)—Sale of six tickets for 25 cents eliminated; school and workmen's tickets raised from 2½ cents to 3 cents. Permitted by State Corporation Commission.

Lynchburg (Lynchburg Traction & Light Company)—Reduced rates eliminated; flat 5-cent fare in effect. Permitted by State Corporation Commission.

Roanoke (Roanoke Railway & Electric Company)—Reduced rates eliminated; flat 5-cent fare now in effect. Permitted by State Corporation Commission.

Washington

Tacoma (Tacoma Railway & Power Company)—Former fare, 5 cents; present fare, 7 cents, fifteen tickets for \$1. Transfers between company's lines and municipal lines provided for. Permitted by City Council.

Tacoma (Municipal lines)—Former fare, 5 cents; present fare, 10 cents; commutation rates, 7½ cents.

Wisconsin

Fond du Lac (Eastern Wisconsin Electric Company)—Sale of six tickets for 25 cents eliminated.

Milwaukee (Milwaukee Electric Railway & Light Company)—Reduced rates abolished in central zone; flat 5-cent fare in effect.

Sheboygan (Western Wisconsin Electric Company)—All fares less than 5 cents eliminated.

All permitted by State Railroad Commission.

Canada

Edmonton (Radial Railway, municipally operated)—Former fare, cash, 5 cents, workmen's tickets, good until 8 a. m., eight for 25 cents; present fare, 7 cents to 11 p. m., after which 10 cents; tickets sold on cars, six for 25 cents; tickets sold at stations, five for 25 cents; two tickets for night fares.

Fort William (Municipal Railway)—Flat 5-cent fare for adults, except after 10 o'clock midnight, when fare is 10 cents; children's tickets, eight for 25 cents; children's cash fare 5 cents.

Montreal (Trainways)—Fare increased in uniform tariff or city territory in accordance with following schedule: 12 o'clock midnight until 5 a. m., 15 cents cash; 5 a. m. to 8 a. m., 6 cents cash or five tickets for 25 cents, and on week days no charge for transfers; 8 a. m. to midnight, 6 cents cash, five tickets for 25 cents, 1 cent for transfer; for school children between five and sixteen years old, week days only between 8 a. m. and 6 p. m., 7 tickets for 25 cents, transfers free.

Quebec Railway, Light & Power Company—Former fare, cash, 5 cents, six tickets for 25 cents; male workmen's tickets, good between 6 and 8 a. m. and 5 and 7 p. m., eight for 25 cents; children under seven, accompanied by elders, free; present fare, cash, 5 cents, twenty-one tickets for \$1; male workmen's tickets, seven for 25 cents; children under seven, accompanied by elders, 3 cents or 10 tickets for 25 cents. Vancouver (British Columbia Electric Railway)—Former fare, 5 cents; present fare, 6 cents. Permitted by City Council.

INTERURBAN RAILWAYS

California

Central California Traction Company—Rates increased by 10 per cent to put them on parity with steam railroad rates.

Colorado

Denver & South Platte Railway—Fares Eaglewood to Littleton increased from 5 to 10 cents; from Denver to Littleton increased from 5 to 11 cents. Permitted by Public Utilities Commission.

Connecticut

Hartford & Springfield Street Railway—Former unit zone fare, 6 cents; present

unit zone fare, 7 cents, 15 tickets for \$1.

Georgia

Augusta-Aiken Railway & Electric Corporation—Rate between Augusta and Aiken increased from 25 to 40 cents. By Circuit Court, which overruled decision of State Railroad Commission refusing increase.

Illinois

Chicago & West Towns Railway—Fares generally increased. Permitted by Public Utility Commission.

Indiana

Rates of all interurban companies increased to 2½ cents per mile. Permitted by Public Service Commission.

Union Traction Company—Fare between Sistersville and New Martinsville increased from 20 to 25 cents. Permitted by Public Service Commission.

Kansas

Kansas City—Western Railway—Fares increased by substitution of mileage system for zone system. Rates 2 cents per mile. Permitted by State Public Utility Commission.

Kentucky

Kentucky Traction & Terminal Company—Fares on interurban lines, excepting through rates from Lexington, increase from 2½ to 3 cents a mile. On Lexington business unit fares in 2-mile zones increased from 5 to 6 cents.

Massachusetts

New Bedford & Onset Street Railway—Former unit zone fare, 6 cents; present unit zone fare, 7 cents.

Northern Massachusetts Street Railway—Length of zones reduced.

Worcester & Warren Street Railway—Former unit fare, 7 cents; present unit fare, 10 cents. All of these permitted by Public Service Commission.

Michigan

Houghton County Traction Company—Rates between Houghton and Calumet increased from 25 to 30 cents. Permitted by State Railroad Commission.

New Hampshire

Manchester Street Railway—Former unit zone fare, 5 cents and 6 cents; present unit zone fare, 7 cents and 8 cents. Permitted by Public Service Commission.

New Jersey

New Jersey & Pennsylvania Traction Company—Former unit zone fare, 5 cents; present unit zone fare, 6 cents. Permitted by Public Utilities Commission.

Ohio

Cleveland, Chagrin Falls & Cincinnati Railway—Mileage rate increased from 2 to 2½ cents. Permitted by Commission.

Cleveland & Eastern Traction Company—Fares between Cleveland and South Euclid raised from 5 to 10 cents. Cuyahoga county attempted to enjoin company from putting increase into effect. Supreme Court refused injunction.

Dayton, Covington & Piqua Traction Company—Rates increased from 2 to 2½ cents a mile. Permitted by Commission.

Ohio Electric Railway—Fares increased to 2½ cents per mile with exception of few short runs.

Pennsylvania

Allentown & Reading Traction Company—Former unit zone fare, 5 cents; present unit fare, 6 cents.

Lackawanna & Wyoming Valley Railroad—Former fare 2 cents per mile; present fare, 2½ cents per mile.

Lehigh Valley Transit Company—Length of zones reduced. Reduced round-trip tickets eliminated. Commutation rates standardized at 4 cents per 2½-mile zone.

Scranton & Binghamton Traction Company—Former unit zone fare, 5 cents; present unit zone fare, 6 cents.

Texas

Texas Electric Railway—Fares over 35 cents increased 8 per cent.

Washington

Puget Sound Electric Railway, Seattle Division—Fare between Seattle and Tacoma and Seattle and Puyallup increased from \$1.35 to \$1.50. Permitted by Public Service Commission.

Washington Water Power Company—Flat 3-cent per mile rate in effect.

West Virginia

Monongahela Valley Traction Company—Former unit zone fare, 5 cents; present unit zone fare, 6 cents.

Newell Bridge & Railway Company—Former fare (on Newell-East Liverpool lines), 5 cents; present fare, 10 cents.

West Virginia Traction & Electric Company—Former unit zone fare, 5 cents; present unit zone fare, 6 cents. Permitted by Public Service Commission.

Canada

London & Port Stanley Railway—Fare increased 15 per cent. Permitted by Board of Railroad Commissioners of Canada.

Buffalo Votes on August 20

Electors Will Pass Upon the Matter of a Higher Fare for the International Railway

Voters of Buffalo, N. Y., are waiting for the opportunity on Aug. 20 to express their preferences on whether or not to repeal the action taken by the City Council waiving certain franchise restrictions and allowing the Public Service Commission for the Second District to fix a higher rate of fare to be charged by the International Railway within the city. Women qualified to vote at the general election in November under the new state law registered with the Bureau of Elections on Aug. 9 and 10 and will be allowed to express their preference at the special election. This will be the first time women have voted in the city and will be the first time a referendum election has been held under the commission charter, adopted three years ago.

WAGES DEPEND ON ELECTION

Upon the result of the election depends the wage recently granted its employees by the railway, also the additional wage increase granted by the War Labor Board. One sentence in the decision rendered by the War Labor Board says that should the City Council revoke its action granting the company permission to apply to the Public Service Commission for a higher rate of fare, the wage increase shall be automatically terminated. Thus the situation will revert back to the original condition and may result in a general strike of all employees.

Mayor George S. Buck and three of the city commissioners are urging voters to ratify the action of the City Council. These city officials were originally opposed to higher street fares, but after Day & Zimmerman, accountants, made an investigation of the financial condition of the company they voted to suspend certain franchise restrictions between the city and the company and recommended to the Public Service Commission that a higher rate of fare be charged. It is generally believed that a 6-cent fare will not be sufficient to pay the wage increase allowed platform employees by the War Labor Board and make improvements which are declared to be absolutely essential to the upkeep of the company's city properties. It is believed by municipal authorities and officials of the International Railway that either a 7-cent or 8-cent fare is necessary or else a 6-cent fare and additional charges for transfers.

COMPANY PLANNING CAMPAIGN

Ivy Lee, of Lee, Harris & Lee, New York, will handle the details of the campaign to be waged by the railway for ratification of the Council's action. Many of the large labor organizations of the city have pledged their support to the company in its effort to secure higher fares. The Mayor has promised to speak before many business and commercial organizations on the com-

pany's need for higher fares. The Mayor was elected on a platform of railway reform, revocation of franchises, etc., but he has apparently realized the serious situation now confronting the railway.

A statement filed with the City Council by the city's expert accountants who have been investigating the financial condition of the International Railway shows that a 6-cent fare would increase the company's gross income from transportation \$1,114,474 a year. Increased wages would take from this sum \$467,500 a year, leaving the company \$646,974 with which to make improvements. Experts say this sum would be too small to make many of the improvements which are essential.

The special referendum election will cost the taxpayers of Buffalo \$30,000. Of this sum \$25,000 will have to be paid to clerks and inspectors of election. Election inspectors get \$10 a day and there are 191 election districts in the city. On election day the polls will be open from 6 o'clock in the morning until 8 o'clock in the evening. Paper ballots will be used in taking the vote. The question will be: Shall the action of the City Council * * * be repealed? By voting "yes," the voter is opposing a higher fare, and by voting "no," the voter favors a higher fare.

RECENT DIVIDEND ACTION QUESTIONED

A formal complaint against officials of the International Railway has been filed with the District Attorney of Erie County by an organization of businessmen opposed to the higher fare. It is alleged in the complaint that officials of the company acted improperly in declaring a dividend of one-half of 1 per cent last March when there was a deficit of \$1,317,829 and that the company filed false financial statements with the Public Service Commission.

In a public statement, President Connette denied any crime had been committed by declaring this dividend. In reference to the charge that the company filed false statements with the Public Service Commission, the District Attorney says this matter will be investigated by the officials of Albany County in which the capital is located.

Fare Plea Reproduced

The New York *Evening Sun* of Aug. 2, gave 16½ in. of space to the plea for fair play addressed to the editors of New York State papers by J. K. Choate, chairman of the special committee on ways and means to obtain additional revenue of the electric railways of New York State.

Financial America and the New York *Commercial* are also among the papers that have reproduced the plea.

The statement by Mr. Choate was reviewed briefly in the *ELECTRIC RAILWAY JOURNAL* for Aug. 3, page 214.

New Interurban Freight Rates in Indiana

Indiana Commission Rejects Plea for Same Schedule as Steam Roads —Allows Special New Scale

New freight rates for the interurban lines in Indiana were authorized on July 31 by the Public Service Commission of that State to be effective for two years. The petition of the electric roads for the same schedule of rates now in effect on the steam roads was denied by the commission, but a new scale was designed to attract light freight for short hauls to the interurbans and to divert heavy freight for long hauls to the steam lines. The same freight classification is maintained, but the new rate scale is as follows:

DETAILS OF RATES

First-class rate, 21½ cents for 100 lb. for 4 miles; first class rates for greater distances to be based on 1 cent for 100 lb. for each 4 miles; second-class rates to be 86 per cent of first-class rates; third-class rates to be 70 per cent of first-class rates; fourth-class rates to be 55 per cent of first-class rates; fifth-class rates to be 40 per cent of first-class rates; and sixth-class rates to be 30 per cent of first-class rates. Thirty-five cents is the minimum charge.

The new rate structure was built on the theory that interurban and steam carrier functions are different, in the terms of the order of the commission, which states that interurban freight transportation is more nearly akin to express service than the steam freight service.

It is held that the interurban terminal cost of handling package freight is much less than that of steam carriers, while the haulage cost is much greater; that a scale of rates adjusted to steam carrier conditions is not suited to interurban conditions; that a scale of reasonable class rates applicable to interurban transportation must necessarily be less for short distances and higher for long distances than steam carrier rates; relatively lower on the high classes and higher on the low classes than steam carrier rates; that uniformity in rates throughout the State is desirable; that if the commission granted the rates prayed for, automobile truck competition with the interurban lines would be stimulated to a degree that would result in a depletion of the interurban revenues from freight transportation.

BURDENS OF COMPANIES REVIEWED

The order of the commission referred to the burden placed on the interurbans by increasing costs of operation, and that the increase in coal rates made by the federal government has borne very heavily upon them, not only in the ratio of increase which affected all utilities, but in the loss of the preferential basis previously accorded the interurban lines in the way of "fuel rates" accorded the steam lines on whose line the coal does not originate.

The commission held that no parallel can be drawn between the interurban and steam-line freight rates, declaring that "an interurban can handle package freight for a distance of 5 miles at a great deal less cost than a steam road; while the steam road cost for a 100-mile haul is less than that of the interurban. Steam rail rates are no criterion for interurban rates, save from the viewpoint of competition. Considered from an operating cost basis, the interurban rates should be lower than steam carrier rates on high-class freights, and higher on low-class freights; lower in short hauls and higher on long hauls."

Taking up the adjustment of the relation between the steam carrier freight rates and those of the electric lines, the commission was confronted by the problem of according to the public reasonable charges for both classes of transportation, and at the same time encouraging the offering of high-class freight to the interurban lines and of low-class freight to the steam carriers. The commission concluded that the way to do this was to authorize a small advance on high-class freight and a larger advance on low-class freight. The commission held that greatly to increase the interurban rates would divert the short-haul package freight business to auto-truck transportation systems. This would take away from the interurban electric railways their most profitable class of freight.

Illinois Traction System Rate Changes

Review of Decision of State Body Holding Electric Railway Subject to Same Conditions as Steam Lines

Stating, in brief, that the electric railway is subject to the same general operating conditions and expenses as the steam railways the Public Utilities Commission of Illinois has handed down two decisions of importance in that State in the case of the Illinois Traction System. These orders allow the Illinois Traction System and the Chicago, Ottawa & Peoria Railway, a subsidiary line, to increase class and commodity rates to a figure equal to that allowed steam carriers in the McAdoo General Order No. 28, and permit the companies to withdraw reduced round-trip and excursion passenger fares.

Both orders were issued on July 30, were effective as of Aug. 1, and are to continue during the war.

Application was made by the Illinois Traction System and the Chicago, Ottawa & Peoria Railway on June 12 and 20 for permission to increase class and commodity freight rates governing the movement of traffic between points in Illinois. No protest was made at subsequent hearings before the commission.

In approving the petition, the commission said in part:

"From the record it appears the petitioners are subject to the same general operating conditions and expenses as exist on steam lines of railroads and that the service performed by them compares favorably and is in competition with the said steam carriers, and that unless they were permitted to increase their freight charges to the same extent serious congestion and inadequate service would result.

"In the granting of said petition the commission authorizes rates equal to but not exceeding the rates now in effect via competing steam carriers between common points, together with the same relative increase between local points, to become effective. The commission reserves the right to enter any further order which it may deem proper and just in the premises."

The Illinois Traction System has petitioned the Interstate Commerce Commission for similar freight rate increases on interstate business.

In petitioning the Illinois Commission for increases in passenger tariffs the system asked permission to cancel all of the present commutation fares now on sale between points in Illinois to increase the one-way local fares to the actual mileage carried, and to charge for round-trip tickets straight 2 cents per mile and to cancel the present Sunday excursion fares between Springfield and Peoria. Objection was entered by the commuters of Edwardsville, Ill., and the commission has not disposed of this part of the petition.

Under the old tariff a round-trip passenger was given a rate approximately 185 per cent of the local one-way rate. The company claimed that this practice had now been done away with by its competing carriers. It was further contended that prior to June 10, 1918, it met the competition of competing short-line fares based upon 2 cents per mile between points on its lines, and at the present time all of such competing carriers by virtue of General Order No. 28 issued by the Director General of Railroads have increased their rates to 3 cents per mile, placing them much in excess of its present rates. For some time prior to June 10, 1918, a rate of \$1.25 per round trip, Springfield to Peoria, was maintained to meet the competition of steam lines. These rates having been canceled by the competing steam carriers the Illinois Traction System asked permission to make the same cancellation. No objection was filed relative to any of the proposed changes except the commutation fares involved.

The commission has also issued an order allowing the Chicago, Ottawa & Peoria Railway to cancel reduced round-trip fares on the same basis as that granted the Illinois Traction.

Indiana Commission Has Jurisdiction

State Supreme Court So Rules in Indianapolis Case After Lower Court Had Decided Other Way

On July 30 the Supreme Court of Indiana handed down a decision ruling in favor of the contention of the Indianapolis Traction & Terminal Company that the Public Service Commission, acting under Sec. 122 of the public utility commission act, has authority to hear the rate increase petition of the company purely on the ground that an unusual emergency exists (with reference to the war). The Supreme Court instructed the Marion County Circuit Court, from which the case was appealed last February, to overrule a demurrer which that court had upheld, and set out that a common writ of mandamus will issue against the Public Service Commission to compel it to take official jurisdiction of the company's appeal for a straight 5-cent fare.

HISTORY OF CASE

The Indianapolis Traction & Terminal Company on Nov. 19, 1917, filed with the commission a petition asking for authority to abolish the six-for-a-quarter and twenty-five-for-a-dollar tickets and charge a straight 5-cent fare, retaining all the present transfer privileges. The petition set out that because of the unprecedented increases in operating expenses due to the war conditions, an increase in fare was necessary to insure a continuance of good service and the solvency of the company. The commission declined to hear the case on the ground that it did not have jurisdiction, owing to the Indianapolis franchise being a special grant of the Legislature. This opinion was upheld by the Circuit Court of Marion County.

The opinion of the Supreme Court sets out that in this particular case the fixing of the rate of fare was not left to the municipality, as is sometimes done, but that the State granted the right to make the present system of fares to the utility as a condition for using a part of the highway system of the State, and the city was not a necessary party, only acting as the agent of the State in incorporating the existing rate schedule in the franchise under which the company operates.

COMMISSION QUALIFIED TO REGULATE UTILITIES

"The Public Service Commission is a legislative agency, assumed to be qualified by knowledge and experience to regulate public utilities of the State with reasonable fairness and substantial justice, not only to the public but to the utility as well," the court said in explaining the character of the body in which the Legislature has invested the rate-making power, which may, under Sec. 122 of the utility commission act, be applied even where contractual relations exist, to relieve a utility in an emergency such as that faced in the present war conditions.

The court states that the franchise

rate would continue to hold, except for Sec. 122, which gives the commission broad powers in an emergency. The court adds that the utility law, and particularly that section, should be liberally construed with a view to the public welfare. Then, it argues, if a utility is in the midst of such an emergency as the present, the commission may take action toward relief as a temporary measure even if contractual obligations would block such relief as a permanent blessing to the utility.

It was agreed between representatives of the Indianapolis Traction &

Terminal Company and the members of the Public Service Commission that it was not necessary to await the formal action of the Circuit Court mandating the commission to hear the case, and the commission has set Aug. 19 as the date when it will hear the petition of the company for the elimination of the reduced-rate tickets and establishment of a flat 5-cent fare in the city of Indianapolis.

The Indianapolis Traction & Terminal Company on Aug. 1 filed a petition with the Public Service Commission asking that it set aside its order that it had no jurisdiction in the matter of fares and enter into another hearing. This action followed the finding of the court that the commission did have jurisdiction in the case. A copy of the decision of the Supreme Court, quoted above, accompanied the petition.

Report Presented in Syracuse Fare Case

Expert Accountants Show Financial Condition of Company, but Make No Recommendations

The report of Price, Waterhouse & Company, New York, N. Y., agreed upon by the New York State Railways, Syracuse and Utica Lines, and the officials of those cities to make an investigation and report of the earnings of the railway properties there was placed in the hands of the Public Service Commission for the Second District on July 31. The report was made in connection with the petition filed by the road for permission to increase fares in Syracuse and Utica from 5 cents to 6 cents. The report covers forty-four typewritten pages besides many schedules. It represents the result of a thorough examination of the books and accounts of the company for the years 1916 and 1917 and the four months ended April 30, 1918. The report gives the facts as summarized but makes no recommendations.

If the rate of wages prevailing from June 15, 1918, had been in force during the four months ended April 30 the net income from railroad operation would have shown on all lines a deficit of \$194,000 and on the Syracuse Lines a deficit of \$70,000.

An appraisal of the company's property which formed a part of the report was not made by the investigators and it was decided to adjourn the hearing until Aug. 7 at which time the makers of the appraisal will be sworn. It is also expected at that time that the Public Service Commission will ask for any additional information which it may desire.

On top of the presentation of the report of Price, Waterhouse & Company came the announcement of the War Labor Board with respect to wages on the New York State Railways. As a consequence Stewart S. Hancock, corporation counsel, who has handled the fare increase opposition for the city of Syracuse and B. E. Tilton, general manager of the local lines of Syracuse both issued statements to the press.

Mr. Hancock doubts the efficacy of the 6-cent fare as a means of adding to the revenues of the company. He intimated, however, that the city will accept the 6-cent fare, but that it will oppose any further increase until the 6-cent method has been tried for a reasonable length of time.

Mr. Tilton is quoted as follows:

"The situation of the company is that it has discontinued the dividend on the common stock and discontinued the dividend on the preferred stock, is not earning interest on the bonds and with the increase in the payroll faces bankruptcy. Without prompt and immediate relief—the increased revenue from a fare of at least 7 cents—the company cannot remain solvent."

The Syracuse papers were quick to express candid opinions on the street railway situation. In concluding an editorial on the railway crisis in the issue of Aug. 3 the *Post Standard* said:

"There can be no continued delays. There can be no more lawsuits to decide where the regulatory powers rest. The city and the railways with the aid or through the medium of the Public Service Commission should agree upon rates just to the city and fair to the company. If two private enterprises bearing the same relationship were similarly in disagreement they would have come to a friendly understanding long ago."

On Aug. 2 the *Syracuse Journal* said:

"We are convinced that the fair-minded people of Syracuse will be accord with our declaration that only are the local street car lines entitled to earn more than operating costs but that too close a paring between net revenues and actual costs would be far more disturbing to the city generally than even the imposition of a 7-cent fare. It is in the interest of all of us that this question of street railway fares be settled at once."

Six Cents in Detroit

Detroit United Puts New Rates Into Effect Following Failure of Council to Grant Relief

The Detroit (Mich.) United Railway on the morning of Aug. 8 raised rates within the limits of the city on the so-called "5-cent" or non-franchise lines, from 5 cents to 6 cents; abolished the eight-for-25-cent workmen's tickets and placed on sale ten tickets for 55 cents.

This action was taken by the company when the Common Council refused to afford the company relief in the way of increased revenue.

In a letter to Mayor Marx, the company through its president, Frank W. Brooks, had offered two fare proposals. This letter was in turn sent to the Council. Mr. Brooks pointed out that the award of the War Labor Board had materially increased the wages of motormen and conductors and that the high and steadily increasing costs of material, equipment, etc., made a revision of fares absolutely necessary. Mr. Brooks' proposals were:

1. That for the time being a 5-cent fare with a charge of 1 cent for a transfer be established on all lines of the city; this proposal suggesting that the franchise on the so-called "3-cent lines" be modified respecting the rate of fare by a day-to-day agreement. This would give a uniform rate of fare throughout the city.

2. That the following rates of fare be authorized: single cash fare, 6 cents; ten tickets for 55 cents, both with free transfer privileges; the rates of fare now in effect on the 3-cent lines to remain unchanged, except the 6 cents cash fare and the ten tickets for 55 cents will be accepted on these lines and be good for a transfer to the so-called 5-cent lines.

Mr. Brooks in his letter quoted the comment of the Labor War Board, which said in discussing the Detroit case:

"The fares allowed the Detroit United Lines are exceptionally low, being 3 cents a passenger on some lines, 4 cents on others and 5 cents on others. They should all be raised to meet the cost due to high prices of needed material and equipment, and the increased pay herein awarded."

Mayor Marx sent the company's proposals to the Common Council with a recommendation that there be an investigation by experts to be employed by the city to determine whether the company was entitled to a raise in fares.

The Council, however, ignored the Mayor's recommendations and gave no heed to the urgent appeal of the company. It adopted a resolution to the effect that the Aldermen were unalterably opposed to the raising of fares; that if any attempt was made by the company to alter fares on the 2-cent lines the Council would deem it a surrender by the company of all its franchise rights; and that if the company raised fares on the 5-cent lines

where franchises have expired it must bear the odium itself.

When company officials, through the Council's action, learned definitely that the Aldermen were not inclined to give the company a fair show, they immediately announced an increase to 6 cents. Proposal No. 2 was put into effect Thursday morning. It was realized that with an election a few weeks off and the politicians again making the railway question an issue, there was no hope that the city authorities would deal justly with the company on the fare question.

The company secured 2,000,000 pennies so that conductors might be able to make change when the 6-cent rate went into effect.

Transportation News Notes

Santa Cruz Would Increase Fares.—The Union Traction Company, Santa Cruz, Cal., has applied to the Railroad Commission of California for permission to increase its fares.

Fare Increase Denial Appealed.—Application to the State Railway Commission of Nebraska for an increase in rates was denied the Lincoln Traction Company on June 18. The case has been appealed to the Supreme Court of Nebraska and will be heard on Sept. 18. The company is asking for permission to increase fares to allow a fair and reasonable return on the investment. At present tickets are being sold six for 25 cents.

Increases for North Carolina Companies.—To meet increased operating costs street railways of Raleigh, Charlotte, Durham and Winston-Salem have been authorized by the State Corporation Commission of North Carolina to increase fares from 5 cents to 7 cents, effective from Aug. 1. The companies will be required, however, to sell four tickets for 25 cents. Among the companies affected are the Carolina Power & Light Company, the Southern Public Utilities Company and the Durham Traction Company.

Jitneys Under Ban in Sacramento.—The jitneys operating in the city of Sacramento, Cal., were put out of commission on July 20 when an injunction was granted forbidding the City Commissioner to hold a special election on the question of whether the jitney ordinance should become effective. Hereafter, before being allowed to operate jitneys will be required to purchase a franchise, which will be granted only in accordance with the commissioner's opinion as to the routes on which jitney service is needed.

Binghamton Wants Fare Relief.—On July 29 through its president, F. L.

Fuller, the Binghamton (N. Y.) Railway petitioned the Common Council to remove any limitations now included in the franchise granted to the company which would prohibit the Public Service Commission from granting permission to increase the fare from the present 5-cent rate to a higher figure. The suspension of the present fare stipulation is asked "for the period of the war and as long thereafter as the Public Service Commission may deem proper."

Montreal Would Charge Seven Cents.—H. E. Smith, comptroller of the Montreal Tramways, speaking before the Public Utilities Commission on the company's application for a rate increase, said that for the present year up to April 30 operations would show a deficit of \$252,538. The company is asking for a 7-cent fare or four tickets for 25 cents with free transfers. Only recently the commission announced the fares to be in force for the next year. This decision was reviewed briefly in the ELECTRIC RAILWAY JOURNAL for July 13, page 78.

Fare Complaint Dismissed.—The Public Service Commission of Pennsylvania has dismissed the complaint of the Merchants' Association of Pottsville against the Pottsville Union Traction Company, in which it was alleged that the company showed discrimination in charging an extra fare from the city line to Westwoods. In dismissing the order the commission ruled that the fixing of fare boundaries is the most difficult problem electric railways have to face, and that the fare is not excessive, as it permits the rider to go through to Minersville, a distance of 3 miles.

Jitney Case to Supreme Court.—The record has been completed and appeal perfected in preparation for taking the case testing the jitney ordinance enacted by the city of Dallas, Tex., to the United States Supreme Court. The style of the case is D. H. Gill et al. vs. the city of Dallas, for injunction. The jitney men lost in all the State courts and are carrying the case to the federal courts as a last resort. The city of Dallas has been cited to appear in the Supreme Court within thirty days from July 6. This means that the city will have until the October term of the court to make answer to the jitney men's petition.

Albany Tariff Further Suspended.—The Public Service Commission for the Second District of New York at its regular session on July 30, Chairman Charles B. Hill presiding, further suspended the operation of the tariff of the United Traction Company, Albany, filed on May 2, under which increased fares were proposed on its lines. Pending the investigation by the commission, the tariff was originally suspended until July 31. The commission was unable to complete its investigation within the period of the original suspension, and on July 30 it passed an order further postponing operation of the increased rates for a period of sixty days from July 31.

Charleston Fare Case Started.—The Public Service Commission of West Virginia has resumed its hearing on the application of the Charleston Interurban Railway for authority to increase its rates on the St. Albans and Cabin Creek lines. By the change an increase in the fare to South Charleston from 5 cents to 10 cents and to Kanawha City from 10 cents to 15 cents is sought. No change is proposed within the city limits. The Libby-Owens Glass Company, located at Kanawha City, and the citizens of that place and of South Charleston are protesting any increase. Evidence was offered in support of the petition of the company. The opposition will not be heard until later.

More Roads Seek Service at Cost.—The Connecticut Valley Street Railway, Northern Massachusetts Street Railway, and the Concord, Maynard & Hudson Street Railway have applied to the Public Service Commission of Massachusetts for an investigation of the capital requirements of their system, preparatory to assuming operation under the service-at-cost act passed by the last Legislature. The engineering and accounting departments of the commission have begun investigations of the physical and financial condition of the properties, which are operated by the interests identified with the Greenfield Electric Light Company and the Turners Falls Power & Electric Company. It has not yet been determined whether it will be necessary to hold public hearings upon these cases.

Desires Service at Cost.—The Northampton (Mass.) Street Railway has notified the Public Service Commission of its intention of accepting the general service-at-cost act for electric railways passed by the last Legislature. Under the terms of the act the commission must determine the amount of the company's capital investment, amount of stock investment and status of the unfunded debt. The commission must also determine the amount of reserve fund and improvement fund necessary for the acceptance of the act. Should the company finally accept the act, it will arrange a fare system of nine gradations, with four units above and four units below the initial one, and automatic adoption above and below the medium unit according to the return yielded. The act also provides for public directors.

Additional Fare Data Submitted.—Members of the committee on streets of the City Council of Richmond, Va., have received from the Virginia Railway & Power Company a tabulated statement of the earnings and expenses of the railway and electric light and power departments of the Richmond division of the company for the years beginning June 30, 1913, to the present fiscal year just closed. This statement is in response to a resolution passed at the meeting of the committee on June 27 at which the matter of increased fares was discussed. The additional data asked for at that time were referred to in the *ELECTRIC RAILWAY JOURNAL* for July 23, page 77. The

committee has since recommended an ordinance providing for a straight 5-cent fare, labor tickets at three for 10 cents to be good until 8 a.m. instead of 7 a.m. and the retention of the 3½-cent school tickets and universal transfer privileges.

Freight Increase Allowed in Ohio.—Permission to increase freight rates was granted to ten Ohio interurban roads by the Public Utilities Commission on July 19. While the increases will be based upon those allowed steam railways by Director General McAdoo, the roads receiving them were compelled to show the necessity for a greater income. The increases apply only to the roads named and, if others find themselves in need of additional revenue, they will be compelled to show necessity in each case. The roads receiving this permission are as follows: Cleveland & Eastern; Ohio Electric; Sandusky, Norwalk & Mansfield; the Toledo, Fostoria & Findlay; the Tiffin, Fostoria & Eastern; the Stark Electric; the Western Ohio; the Toledo, Bowling Green & Southern; the Cleveland & Chagrin Falls, and the Cleveland, Southwestern & Columbus. New schedules must be filed with the commission fifteen days before they become effective.

Franchise Fare Provisions Rescinded.—George Bullock, as receiver of the Buffalo & Lake Erie Traction Company, Buffalo, N. Y., has filed with the Public Service Commission for the Second District copies of certain contracts which provide that all provisions relating to passenger fares in franchises held by the company or its receiver are annulled for a period of fifteen years from July 1, 1918. The contracts also provide that the receiver, the company or their successors, shall from July 1, 1918, charge "such rate or rates of fare as may be fixed from time to time and for such time during said period of fifteen years as the Public Service Commission of the State of New York or its successor may order and direct." These contracts are with the following: Town board and superintendent of highways, town of Westfield; president and trustees, village of Westfield; superintendents of highways and town boards of the towns of Portland, Ripley and Brocton and the president and trustees of the village of Brocton.

Attorney General Decides Road's Status.—According to an opinion to the Public Service Commissioners of Washington by Attorney General Tanner, relinquishment of the Spokane & Inland Empire Railroad to private ownership by the federal railroad directorate automatically revives the freight and passenger rate schedules in effect on that line before the government's increase of 25 per cent went into effect last month. The Attorney General does not hold directly that the State-regulated rates are now the only legal rates the Spokane & Inland Empire Railroad may charge, but that the Public Service Commission has the right to proceed with complaints on the basis that the

jurisdiction of State regulation was re-extended over the road when control of it was surrendered by the federal government. As noted in the *ELECTRIC RAILWAY JOURNAL* of July 20, page 131, this road was recently referred to by the Public Service Commission as being "In a Hell of a Fix" as a result of changes in rates and division of responsibility following government control.

Kansans Can't Dodge Six-Cent Fare.—Officials of Kansas City, Kan., were barred by Federal Judge John H. Cotteral from proceeding in the State Court in their fight against the collection of an extra cent for fare at the State line until the suit pending against the Kansas City Railways in the Supreme Court is decided. Judge Cotteral maintained that the Federal Court has jurisdiction in such matters and that the State Court cannot legally issue a restraining order. Hence the collection of the extra fare. The Kansas City Railways has adopted a new transfer marked with a large red cross in order to prevent Kansas City, Kan., patrons from evading the extra charge across the State line. Many persons have been getting a transfer when entering the cars in Kansas, leaving the cars before reaching the State line where the cent is collected, and walking a short distance to a transfer point across the line. Those who attempt that ruse now are forced to give up their transfer and pay a 6-cent fare. Patrons who remain on the car until one of the six collection points along the State line is reached tender their marked transfer and 1 cent and receive in return a Kansas City, Mo., transfer for all points on that side of the State line.

Increase in Jersey Mileage Charge.—The Public Service Railroad has served a notice with the Board of Public Utility Commissioners of New Jersey that it proposes to put into effect a new schedule of rates for transportation, so that the mileage charge will be 2½ cents with a minimum fare of 10 cents between stations, except between Chrome and Chrome Junction, where the fare will remain 5 cents. The Public Service Railroad is a part of the Public Service Corporation's transportation system in New Jersey. It operates under a railroad charter and has no connection as to service with the Public Service Railway. The increased rates, if put into effect, will boost the transportation charges between Bayway, Elizabeth and Bonhamtown, between Bayway, Elizabeth and Sewaren and between Milltown Junction and Trenton. The proposed rates would not affect the operation of cars of the company over the tracks of the Public Service Railway in Trenton from the outskirts to the center of the city. This section of the road is operated as a trolley line and on the property of the railway the railroad's cars are being used. The new rates would not affect any section of the State where the railroad cars are operated over the railway's tracks. The old rate was 2 cents a mile.

Personal Mention

H. Bunce has been appointed roadmaster of the Pacific Coast Railway, Seattle, Wash., to succeed P. Dineen.

L. H. Crowell has been appointed assistant treasurer of the Columbus (Ga.) Railroad to succeed A. A. Wilbur.

C. M. Kittle has been made vice-president of the Kensington & Eastern Railroad, Chicago, Ill., to succeed W. L. Park.

J. P. Pulliam has been appointed acting treasurer of the Wisconsin Railway, Light & Power Company, Winona, Minn.

Otto Kirchheiner has been appointed master mechanic of the Key West (Fla.) Electric Company, to succeed E. D. Loper.

A. F. Marion has been appointed chief engineer of the Pacific Coast Railway, Seattle, Wash., to succeed N. D. Moore.

John Fisher has been appointed chief engineer of the Western Light & Power Company, Boulder, Col., to succeed A. Jardine.

F. O. Cooke has been appointed vice-president of the Fresno (Cal.) Interurban Railway Company to succeed J. J. Mahoney.

Herbert A. Loring has been elected president of the Western Light & Power Company, Boulder, Col., to succeed Guy E. Tripp.

E. N. Thyse has resigned as superintendent and purchasing agent of the Mankato (Minn.) Electric Traction Company.

L. P. Peterson has been appointed engineer of cable equipment of the United Railroads, San Francisco, Cal., to succeed J. H. Stott.

R. W. Wise has been appointed secretary of the Petaluma & Santa Rosa Railway, Petaluma, Cal., to succeed E. T. McMurray.

Charles P. Stone has been appointed auditor of the California Street Cable Railroad, San Francisco, Cal., to succeed Allen Knight.

E. W. Ackerman has been appointed auditor of the Interurban Railway & Terminal Company, Cincinnati, Ohio, to succeed C. Hogan.

S. Gerlan has been appointed purchasing agent of the Western Light & Power Company, Boulder, Col., to succeed H. U. Wallace.

J. J. Ahearn has been appointed inspector of rolling stock of the Ottawa (Ont.) Electric Railway, succeeding R. A. Baldwin, promoted.

J. S. Billings has been appointed auditor of the Tuscaloosa Railway & Utilities Company, Tuscaloosa, Ala., to succeed G. A. Daniels.

H. V. Schenck has been appointed assistant secretary and assistant treasurer of the Grand Rapids (Mich.) Railway, to succeed S. E. Wolff.

H. D. Jennings has been appointed auditor of the Waterville, Fairfield & Oakland Railway, Waterville, Me., to succeed John S. Everett.

R. A. Baldwin, heretofore inspector of rolling stock of the Ottawa (Ont.) Electric Railway, has been appointed master mechanic of the company.

C. A. Semrad has been appointed acting general manager of the Western Light & Power Company, Boulder, Col., to succeed H. U. Wallace.

J. F. MacGilvray has been appointed treasurer of the Fort Smith-Oklahoma Light & Traction Company, Fort Smith, Ark., to succeed R. D. Beard.

Charles Vickery has been appointed roadmaster of the Fairburn & Atlanta Railway & Electric Company, Fairburn, Ga., to succeed G. T. Wooten.

D. A. Roberts has been appointed superintendent of the Southern Illinois Railway & Power Company, Harrisburg, Ill., to succeed C. F. Richardson.

H. I. Reuler has been appointed chief engineer of the Atchison Railway, Light & Power Company, Atchison, Kan., to succeed Henry F. Bryant.

Gus Peterson has been appointed auditor of the Minneapolis, Anoka & Cuyuna Range Railway, Minneapolis, Minn., to succeed C. A. Bratnober.

H. C. Mackey has been appointed comptroller of the Wisconsin Railway, Light & Power Company, Winona, Minn., to succeed Charles C. Major.

Don Baumhart has been appointed engineer of overhead construction of the Hutchinson Interurban Railway, Hutchinson, Kan., to succeed D. T. Taylor.

J. S. Minary has been appointed auditor of the Benton Harbor-St. Joe Railway & Light Company, Benton Harbor, Mich., to succeed Oren A. Small.

F. L. Farrell has been appointed general freight and passenger agent of the Fresno (Cal.) Interurban Railway to succeed M. T. Dohner, who is now in the United States army.

Ralph W. Eaton for five years electrical engineer for the Shore Line Electric Railway, Norwich, Conn., has been chosen to succeed Robert L. Brunet as public service engineer at Providence, R. I.

C. F. Richardson has been appointed assistant general superintendent of the Indiana Railways & Light Company, Kokomo, Ind. Mr. Richardson was formerly general superintendent of the Southern Illinois Railway & Power Company, Harrisburg, Ill.

R. B. Claggett, secretary and treasurer of the Columbus Railway, Light & Power Company, Columbus, Miss., who is also interested in similar corporations at Greenville, Miss., and Lake Village, Ark., has been commissioned as a lieutenant in the aviation corps and is now stationed at Kelly Field, near San Antonio, Tex.

Morton G. Lloyd, electrical engineer in charge of safety work in the Bureau of Standards, Washington, D. C., has been appointed a member of the electrical committee of the National Fire Protection Association, to represent the bureau. Dr. Lloyd is a fellow of the American Institute of Electrical Engineers and has served upon its standards committee and various other committees.

Charles Barrington, Jr., has resigned as purchasing agent of the Los Angeles (Cal.) Railway Corporation after having been connected with the company for seventeen years. Mr. Barrington has now become connected with the Hubbs-Storage Battery Company, in Los Angeles, manufacturers of storage batteries for automobile starting, lighting, etc., as vice-president and general manager. He organized this company about a year ago.

William M. Casey, former superintendent of transportation of the Denver (Col.) Tramway, has been appointed superintendent of transportation of the Washington Railway & Electric Company, Washington, D. C., succeeding William F. Dement. Mr. Casey, from the time of his leaving Denver at the end of 1916 until his new appointment, has been on the staff of John A. Beeler, consulting engineer, who is advising the Public Utilities Commission of the District of Columbia on the solution of its traffic problems.

Erwin W. Clapp, for the last eight years superintendent of the Bristol & Norfolk Street Railway, with headquarters at Randolph, Mass., has resigned to join the staff of the Bay State Street Railway, Boston. In his new post Mr. Clapp has been assigned to the office of the manager of transportation, reporting to Ralph M. Sparks, head of that department. Upon leaving the Bristol & Norfolk road Mr. Clapp was presented with a gold watch and charm by employees who have been associated with him and served under him.

William F. Dement has been appointed by the Washington Railway & Electric Company, Washington, D. C., to fill the new position of superintendent of employment and instruction, which has been created in view of the extraordinary labor conditions prevailing. Mr. Dement leaves the position of superintendent of transportation to take up his new duties, for which he is peculiarly fitted, having been with the company since the horse car days and having organized and conducted the instruction department fifteen years ago.

A. J. Witchel has been appointed chief engineer of the Spokane & Inland

Empire Railroad and the United Railways, with headquarters at Portland, Ore. Mr. Witchel has been connected with the North Bank System since its organization. The properties which he will now supervise were not taken over by the government when the Spokane, Portland & Seattle, Oregon Electric and Oregon Trunk line were federalized. A. E. Lupfer, chief engineer of the Spokane, Portland & Seattle lines under government supervision, will relinquish supervision of the Spokane & Inland Empire and United Railways lines.

Obituary

Charles A. Goodnow, vice-president of the Chicago, Milwaukee & St. Paul Railroad, died at the New Washington Hotel, Seattle, Wash., on July 26, following a brief illness. Mr. Goodnow went to Seattle recently to confer with officials of the railroad company and to attend to business concerning the electrification of the railroad. Mr. Goodnow was born in North Adams, Mass., on Dec. 22, 1853. He began his railroad career as a telegraph operator on the Hoosic Tunnel route and was advanced to train dispatcher before leaving that road and going to the West Shore as trainmaster during the period of construction. He went West in 1883 to take a position as train dispatcher on the Chicago, Milwaukee & St. Paul Railroad, and later as superintendent of construction on the new lines into Dakota. He went to the Burlington in charge of construction when the Chicago, Burlington & Quincy line was extended to St. Paul and Minneapolis, returning to the Milwaukee as superintendent, and later as assistant general superintendent. After the reorganization of the Chicago & Alton he was made general manager of that company, and for a time held a similar position with the Chicago, Rock Island & Pacific. Returning again to the Milwaukee he was made assistant to President A. J. Earling, and had charge of the building of the Galatin valley road in Montana, the location and construction of the Milwaukee lines to Lewistown and Great Falls, Mont., and the securing of the exceptionally fine terminals which the Milwaukee has in Great Falls. For the past five years he had given exclusive attention to the electrification of the Milwaukee. He had seen his plans brought to successful completion on that portion of the road from Harlowtown, Mont., to Avery, Idaho, and the results had fully justified his expectations. On his return to Seattle just before his death Mr. Goodnow announced that the work on the western end of the road was progressing so satisfactorily that electric locomotives would be running into Seattle from Othello by July 1, 1919.

Construction News

Construction News Notes are classified under each heading alphabetically by States. An asterisk (*) indicates a project not previously reported.

Track and Roadway

Southern Pacific Company, San Francisco, Cal.—It is reported that the Chino branch of the Southern Pacific Company will probably be electrified and extended to Corona.

San Francisco, Cal.—The Board of Supervisors of San Francisco has instructed the Mayor to assure the Emergency Fleet Corporation that San Francisco will take over the proposed road to Hunter's Point after the war. This action was taken in complying with the desire of the federal government for an authoritative expression from the city on the subject of the electric railway to the proposed ship repair plant at Hunter's Point, where 100 acres are to be used adjacent to the dry docks. The government is to advance the funds for the construction of the road.

Detroit (Mich.) United Railway.—Work on the Ferndale Avenue extension of the Detroit United Railway is progressing rapidly, and it is expected that the line will be ready for operation by September. The new Ferndale main line begins at the junction of Springwells and Ferndale Avenues, and runs west on Ferndale to Woodmere Avenue, where it branches off onto a private right-of-way, continuing to a connection with Dearborn Avenue. The line then runs over Dearborn Avenue to Fort Street connecting with the Fort line at Fort Street and Dearborn Avenue. There is also a branch running north from Ferndale Avenue to the northerly end of the Ford plant. The line intersects Baby Creek at two points and this necessitated the construction of bridges.

Public Service Railway, Newark, N. J.—It is expected that the extension of the Public Service Railway to the Submarine Boat Corporation plant and the United States Army Quartermaster's Depot, both at Port Newark, will be completed by Labor Day, Sept. 2. The extension will provide facilities for about 20,000 workmen.

Cincinnati, Milford & Loveland Traction Company, Cincinnati, Ohio.—The Public Utilities Commission of Ohio has denied the application of the Cincinnati, Milford & Loveland Traction Company, the property of which was recently sold to the bondholders' committee, to junk the road.

Lake Shore Electric Railway, Cleveland, Ohio.—The Lake Shore Electric Railway will complete its cut-off near Huron in September. All of the work except that within the corporation of

Huron has been finished. The cut-off tracks will reduce by ½-mile the traction mileage from Sandusky to Cleveland. The cost of the work is approximately \$180,000.

Seattle & Rainier Valley Railway, Seattle, Wash.—To provide a connecting link between Division A and the municipal elevated street railway lines, the city has asked the Seattle & Rainier Valley company to relinquish its abandoned tracks along Washington Street, from First Avenue South to Fourth Avenue. In a letter to John C. Higgins, attorney for the Seattle & Rainier line, Councilman Oliver T. Erickson, chairman of the utilities committee, states that "Under agreement on common-user rights, the city could use the tracks, but rehabilitation of the line involves big expense, and therefore it would be better for your company to surrender that piece of its franchise to the city and donate what is left of the old tracks."

Shops and Buildings

Pacific Electric Railway, Los Angeles, Cal.—New quarters have been rented by the Pacific Electric Railway in the Odd Fellows' Building at Whittier. The first floor will be remodeled into a station which will more nearly meet the requirements of the city than have the old quarters in the Mason Building.

New York, N. Y.—A trolley station will be established on the Queensboro Bridge at Blackwell's Island for the use of persons visiting the hospital and prison on the island. The cost is estimated at \$10,000 and will be paid for by the Department of Charities of the City of New York.

Power Houses and Substations

Des Moines (Ia.) City Railway.—This company is completing the construction of a new substation building at East Fourteenth Street at Des Moines Street. This is the last building to be erected in the substation plans of the Des Moines City Railway Company in connection with its rehabilitation plans.

Portsmouth, Dover & York Street Railway, Dover, N. H.—Work has been begun on the laying of the cable from the power plant of the Rockingham County Light & Power Company to Badger's Island. This cable when completed will furnish energy to operate the Portsmouth, Dover & York Street Railway.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS

FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES • MARKET QUOTATIONS • BUSINESS ANNOUNCEMENTS

Car Enamels, Varnishes and Paints Stiffen in Price

Due to Continued Increases in Cost of Material and Labor—Railway Buying Steady

In the spring prices for enamels, varnishes and mixed paints used in the electric railway field were going up rapidly. Since then further advances, which were predicted at the time in the *ELECTRIC RAILWAY JOURNAL* have materialized. Traction properties have not bought freely, excepting in a few instances, for reasons too numerous to mention and quite familiar to everybody knowing anything of natural conditions. At the present time such varnishes and paints as have been bought are for overhauling or the reshipping of cars. This means, of course, a steady, if comparatively, modest demand.

Linseed oil, China wood oil, varnish gums, reducers (turpentine), pigments ground color rubbings have not only risen in price, but additional increases are coming along with the abnormal existing conditions. For example in the last few weeks enamels have gone up 25 per cent; varnishes, 10 to 15 per cent; oil enamels, 25 per cent; varnish enamels, 10 to 15 per cent; car paints, 10 to 25 per cent. Yellows and greens are hard to get and the situation is growing worse. Linseed oil has advanced 15 to 20 per cent, and paint and varnish manufacturers declare it is going out of sight. Linseed oil substitutes are now 40 per cent above the former cost, with reducers up 50 per cent.

Crushers of linseed oil do not care to accept orders except for specifications to be shipped at once from stock if they have it. Few are disposed to obligate themselves for oil to be delivered in the future, as they are four weeks and more behind now on deliveries. There are slight prospects of catching up because of the dearth of flaxseed. The situation would be greatly improved if the embargo on importations of seed from the Argentine was lifted, and if the necessary ocean tonnage could be found to bring it north to the United States. The supply of flaxseed raised here and in Canada has long since been exhausted and prospects for the fall are none too good. Paint manufacturers say this outlook renders opinions on future prices for finished goods purely problematical. Domestic holders of the oil and seed are waiting for a still higher market.

China wood oil, the base of all fine car varnishes and enamels, is not only difficult to obtain, in any satisfactory quan-

ties, but its price has been rising in proportion. Potash, another essential paint base, is scarce and high. Colors are restricted in delivery to the immediate future, with few if any orders being accepted for longer periods than three months, and then the price at shipment controls. There is a heavy demand for turpentine and something of a shortage is developing. Scarcity of skilled labor and difficulties of transportation are also factors of the first importance in all car painting and finishing commodities.

Traction Material Bought for Foreign Countries

Eastern and Western Manufacturers Making Heavy Shipments for New Construction Work

If buying of railway equipment and material for domestic uses is sluggish it appears the deficiency is being made up to some extent by heavy purchases for the export trade. One large Eastern manufacturer has recently executed an order of considerable size in overhead material for South American countries. In view of the quantity taken and the character of the equipment it is evidently not for maintenance or replacements but for new construction work. The manufacturer, in speaking of this particular transaction, stated that while this business was very satisfactory, he expected further and larger orders from the same source.

A Middle West concern also volunteered the information, that it had booked and shipped a number of unusually large orders of transmission construction equipment for France and Spain. The business was placed in New York by direct representatives of the foreign companies. Both of these orders ran into large amounts, totalling fully \$200,000.

Of domestic trade a manufacturer of high standing said that since 1915 the traction roads had been out of the market, excepting for necessary material and equipment for maintenance and replacements. This condition of affairs had led to a more active cultivation of the export field.

Catalogs Wanted

The Montreal Tramways Commission, Royal Trust Building, Montreal, will be pleased to receive catalogs, booklets, bulletins, data or samples from manufacturers of, or agents for, all kinds of electric railway supplies, appliances, machinery and equipment.

Pre-War Prices Compared With Current Increases

Electric Railway Company Presents Tabulated Statement of Cost Differences

In its petition to the City Council of Akron, Ohio, for an increase of fares on June 24 by the Northern Ohio Traction & Light Company a statement of comparative costs of equipment, accessories and supplies was submitted. The years 1914 and 1915 witnessed normal prices for material used in railway operations, the difference up to the present time being shown in the appended table:

Per cent Increase		Per cent Increase	
Articles		Articles	
Solder	156	Track shovels...	58
Pig lead.....	193	Steel wheels....	76
White lead....	87	Boiler tubes....	800
Shellac	150	Coal	131
Armature coils..	79	Armature bear-	
Magnet wire....	133	ings	77
Wool waste....	104	Journal bearings	115
Trolley wheels..	53	Axle bearings... 106	
Trolley harps... 119		Castings, steel.. 114	
Trolley rope.... 88		Angle bars, 7 in.	
Dry batteries... 93		x 20 in..... 134	
Linseed oil soap. 121		Bolts, track.... 107	
Brooms	127	Rails	82
Carbon brushes. 450		Steel ties	32
Gear cases..... 154		Spikes, track... 130	
Linseed oil.... 142		Ties, oak..... 31	

The company adds that these are but a small part of the full list of all materials used in the operation of the railway. Some of the items enumerated are used in smaller quantities, some in larger, but the list shown gives evidence of the general increase.

Coal Production Still Short

Production to Date Is 15,000,000 Net Tons Behind the Schedule for the Year's Requirements

The output of bituminous coal in the United States, according to the weekly report of the Geological Survey, declined approximately 1 per cent during the week of July 27. The production is estimated at 12,802,000 net tons, a decrease compared with the week preceding of 121,000 net tons but an increase over the corresponding week of 1917 of 1,471,000 net tons or 13 per cent. The average daily production is estimated at 2,134,000 net tons as against 2,154,000 net tons during the week of July 20 and as compared with 1,889,000 net tons during the week of July 27, 1917.

Last week's output, while 343,000 net tons or approximately 3 per cent in excess of weekly requirements of 12,459,000 net tons during the balance of coal year to make up the deficit to date, is nevertheless 1,300,000 net tons or 9 per cent behind the weekly requirements during the balance of the sum-

mer months to make up the deficit to date.

The difference between the summer requirements and those specified for the balance of the coal year is accounted for by the necessity to ship practically all lake coal during the summer months and 50 per cent more tidewater coal to New England during the summer than in the winter. Production to date is approximately 15,000,000 net tons behind schedule, and in order to meet all requirements as outlined by the United States Fuel Administration it will be necessary that the output of coal during the last of the summer months, August and September, be equivalent to more than 14,000,000 net tons per week, 714,000 net tons or 5.5 per cent in excess of the record to date.

Inquiries for Snowplows and Sweepers Running Behind

Electric Railway Properties Seemingly Indifferent to Next Winter's Storms—Cost of Equipment Higher

While this is the buying season for snow-clearing equipment very few orders are being booked. Brooms and brushes of every description have been advancing in price rapidly, one of the latest increases being from 10 to 25 per cent, effective July 15. On some grades of brooms the market is nearly bare, and buyers are being advised by manufacturers to anticipate their requirements as far ahead as possible if they wish to take advantage of the current cost.

For a while quite a number of orders were filed for snowplows and sweepers, and the manufacturers looked forward to a brisk demand. But for inexplicable reasons, inquiries seemed to drop off short. In this field also purchasing agents and traction managers were cautioned against the constantly increasing cost of this equipment. They were likewise warned that if early and dependable deliveries were a primary consideration, specifications should be put in the maker's possession before the middle of the month and not later than Sept. 1.

An advance of 25 per cent in the price of plows and power sweepers was made in June, with no revision since. Manufacturers are not sure how long the current selling figure can be maintained. At any rate, it is believed that if orders multiply shortly prices will go up again. Small sales mean unchanged cost, as enough material has been accumulated to take care of such orders. The buying averages about the same every year.

So far virtually no inquiries have been received for ice cutters. Last winter this equipment sold readily. Horse-drawn snow removers are being bought for early delivery. The changes in price of such lines have followed the steel and iron revisions, rating higher, of course, than the corresponding figures of a year ago.

Heavy Demand for Spraying Equipment

Raw Materials Being Secured in Good Quantities—Scarcity of Piping Brings About Higher Prices

Unusually heavy calls for spray cooling apparatus and for painting equipment operated on the spraying principle are reported by the Spray Engineering Company, Boston, Mass. An interesting application of the air-washing principle has lately been made by this concern in connection with the loading of gas shells, special equipment having been fitted up to dispose of surplus gas released during the filling process. The spray painting apparatus of this company has just been accepted by the American Bitumastic Enamels Company for use in painting vessels shortly to be launched at the Hog Island yard, and an initial shipment of ten sets has just been forwarded. The Chicago Railways Company is using this apparatus for the painting of street poles carrying trolley and other overhead equipment by using an extension arm which does away with a ladder. It has been found that car trucks can be painted with the spray equipment in about twelve hours against twenty-four hours by the usual hand methods, and the work can be done with the trucks in place under a freshly painted car body.

President L. H. Parker states that the total business of the company in May, 1918, was double that of any previous month, and that June also showed a gross business far in excess of other months with the exception of May. Raw materials are being secured in good quantities through government authorization. On account of the recent scarcity of piping, it has been necessary lately to increase the selling price of some of the company's products to correspond to the higher cost of this material.

Steel Rail Price Undetermined

Manufacturers Still Unable to Agree on Price for Presentation to War Industries Board

According to the latest reports on going to press steel rail manufacturers have not yet come to an agreement over the price which they believe should rule for the next few months. The War Industries Board, through its price-fixing committee, will of course make the final decision, but no meeting between the government representatives and manufacturers has taken place.

Some of the manufacturers, it is reported, want the price to remain at the present level of \$55 a ton for Bessemer and \$57 for open hearth, while others are more in favor of a new basis around \$51 to \$53 a ton.

The government, through control of the railroads, has become practically the only customer for rails. Europe has taken very large quantities, but the

tonnage has fallen off during the past year as indicated by exports of 405,278 tons during the eleven months ended May 31, against 533,152 tons in the same period in 1917 and 489,037 tons two years ago.

Centralizing Government Purchasing

Boards of Review Control Contracts—Purchase of Railway Materials Assigned to Engineers' Branch

Organization of the centralized purchasing scheme whereby the General Staff controls the buying of all commodities and supervises all contracts for the Army is rapidly progressing. Already assignment of purchases of a number of commodities has been made to the several branches of the War Department, and boards of review are passing on all contracts in order to insure uniformity of contract control and provisions. The general administration of the scheme is under the direction of Brig. Gen. Hugh S. Johnson, head of the purchase and supply branch of the division of purchase, storage and traffic of the General Staff of the Army.

The purchase of railway materials is assigned to the engineers' branch. This branch purchases among other things paint containers, gantry cranes, locomotive cranes, paint driers, enamels, japans, lacquers, paint, steam shovels, turpentine, varnishes, linseed oil, and railway equipment.

Renewed Interest in Fare Boxes

A renewed interest in fare boxes is apparent from numerous inquiries and orders. As evidence of this condition, the Johnson Fare Box Company, Chicago, Ill., reports the following orders recently received from some of the principal traction properties.

United Railroads, San Francisco, Cal., 450 boxes; Takoma Railway & Power Company, Tacoma, Wash., 163 metal ticket boxes; Minneapolis (Minn.) Street Railway, 100 boxes; Memphis (Tenn.) Street Railway, 62 metal ticket boxes; Public Service Railway, Newark, N. J., 58 boxes; Pacific Electric Company, Los Angeles, Cal., 47 boxes; Stone & Webster Properties, Texas and Oklahoma, 35 boxes; Gary (Ind.) Street Railway, 28 metal ticket boxes; Utah, Idaho Central Railway, Ogden, Utah, 20 boxes; Mobile Light & Railway Company, 10 metal ticket boxes.

Rolling Stock

The Sheffield (Ala.) Company has purchased from the Cincinnati Car Company two motor cars, double equipment, Westinghouse 101-B, and two all-steel trailers. The company also is negotiating with the car builders for three additional motor cars and three trailers.

Trade Notes

R. H. Corson, representative of the National Carbon Company of San Francisco, will establish offices at 314 Empire State Building, Spokane, which will become the distributing center for the Inland Empire, Northern Idaho & Western Montana.

Trolley Supply Company, Canton, Ohio, reports that it has received from the Boston Elevated Railway an order for 400 No. 2 Simplex roller bearing trolley bases to be used on the road's new cars.

Washington Railway & Electric Company, Washington, D. C., is using "Presto" drawing holders as described in the ELECTRIC RAILWAY JOURNAL of Dec. 15, 1917, page 1086, for the purpose of filing car schedules. The "Presto" holder is manufactured by the National Company, Boston, Mass.

L. D. Calhoun has been appointed as assistant sales manager of the Square D Company, manufacturer of electrical safety switches, at Detroit, Mich. Mr. Calhoun has been advertising manager of the company for the past year, and in addition to his new duties will continue to handle the company's advertising, etc.

J. N. Mahoney, for twelve years connected with the engineering department of the Westinghouse Electric & Manufacturing Company, has tendered his

resignation from that company and will open consulting offices in New York. For the last eight years Mr. Mahoney has been in charge of designing switches, fuses and circuit breakers and prior to that time was connected with the railway engineering department in charge of control design.

F. A. Mansfield, formerly connected with the sales department of the Westinghouse Electric & Manufacturing Company at East Pittsburgh, Pa., has resigned to take the position of Pittsburgh district sales manager of the Mechanical Appliance Company at Milwaukee, Wis. This company manufactures a complete line of alternating-current and direct-current motors, small generators, motor-generator sets and inverted rotaries.

American City Bureau, New York, N. Y., is the title of consolidation of the American City Bureau and the Town Development Company. Its purpose is to build and maintain civic commercial organizations in different municipalities, improve chamber of commerce methods and broaden the scope of commercial organizations. It also conducts an annual summer school for secretaries. Harold S. Buttenheim is president.

Aero Fire Alarm Company, New York, N. Y., is manufacturing a hollow wire of small diameter which can be carried to buildings or around moldings and extends to a cabinet containing a sensitive diaphragm and electrical contact. In the case of fire the air in the tube expands, thus creating a pressure on

the diaphragm and causing an alarm. It has been admitted to the list of fire apparatus authorized by the National Board of Fire Underwriters.

The Dearborn Chemical Company, Chicago, Ill., has just made general announcement of the establishment of a specialties department, for the manufacture and marketing of a number of specialties of interest to manufacturers of steel products, including a rust preventive, known as No-Ox-Id, which is already in use in many plants. Other specialties developed by the Dearborn Laboratories are cutting oils for use in metal cutting, to lubricate the cutting tool and prevent overheating; quenching oils, for heat treating; drawing oils, and Dearboline—a preparation for cleansing machined parts of emery or grease.

New Advertising Literature

Carleton-Wenstrom Company, Philadelphia, Pa.: Circular describing Carven ball bearings. The specifications and list price of these ball-bearings for the 200 series is given.

Cruban Machine & Steel Corporation, New York, N. Y.: "Safest Solderless Electrical Connectors" is the title of a circular that is being distributed to the trade. This circular describes and illustrates the several kinds of connectors that are manufactured by this company.

NEW YORK METAL MARKET PRICES

	July 31	Aug. 7
Copper, ingots, cents per lb.	26	26
Copper wire base, cents per lb.	29.25	29.25
Lead, cents per lb.	8.05	8.05
Nickel, cents per lb.	40	40
Spelter, cents per lb.	8.25	8.45 to 8.55
Tin, Chinese, cents per lb.	94	92
Aluminum, 98 to 99 per cent., cents per lb.	133.00	133.00

* No Stralta offering. † Government price in 50-ton lots or more, f. o. b. plant.

OLD METAL PRICES—NEW YORK

	July 31	Aug. 7
Heavy copper, cents per lb.	23½	23.50 to 24.50
Light copper, cents per lb.	20½	20 to 21.50
Red brass, cents per lb.	22	21 to 22
Yellow brass, cents per lb.	14	14.30 to 15
Lead, heavy, cents per lb.	7	7.12½ to 7.50
Zinc, cents per lb.	5½	5½ to 5½
Steel car axes, Chicago, per gross ton	\$41.52	\$41.52
Old carwheels, Chicago, per gross ton	\$29.00	\$29.00
Steel rails (arrap), Chicago, per gross ton	\$34.00	\$34.00
Steel rails (relaying), Chicago, gross ton	\$60.00	\$60.00
Machinist shop turnings, Chicago, net ton	\$16.25	\$16.25

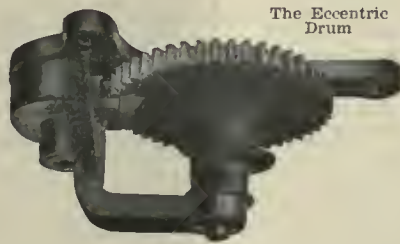
ELECTRIC RAILWAY MATERIAL PRICES

	July 31	Aug. 7
Hubber-covered wire base, New York, cents per lb.	30 to 37	30 to 37
Weatherproof wire (100 lb. lots), cents per lb., New York	32.40	32.40
Weatherproof wire (100 lb. lots), cents per lb., Chicago	37.50 to 37.72	33.00 to 37.72
T rails (A. B. C. E. standard), per gross ton	\$70.00 to \$80.00	\$70.00 to \$80.00
T rails (A. B. C. E. standard), 100 to 500 ton lots, per gross ton	\$67.50	\$67.50
T rails (A. B. C. E. standard), 500 ton lots, per gross ton	\$62.50	\$62.50
T rail, high (Shanghai), cents per lb.	4½	4½
Rails, girder (grooved), cents per lb.	4½	4½
Wire nails, Pittsburgh, cents per lb.	3½	3½
Railroad spikes, drive, Pittsburgh base, cents per lb.	4½	4½
Railroad spikes, screw, Pittsburgh base, cents per lb.	8	8
Tie plates (flat type), cents per lb.	5½	5½
Tie plates (brake type), cents per lb.	5½	5½
Tie rods, Pittsburgh base, cents per lb.	7	7
Flash plates, cents per lb.	5½	5½
Angle plates, cents per lb.	5½	5½
Angle bars, cents per lb.	5½	5½
Rail bolts and nuts, Pittsburgh base, cents per lb.	4.90	4.90
Steel bars, Pittsburgh, cents per lb.	5	5
Sheet iron, black (24 gage), Pittsburgh, cents per lb.	4.90	4.90
Sheet iron, galvanized (24 gage), Pittsburgh, cents per lb.	5.80	5.80
Galvanized barbed wire, Pittsburgh, cents per lb.	4.35	4.35

	July 31	Aug. 7
Galvanized wire, ordinary, Pittsburgh, cents per lb.	3.95	3.95
Car window glass (single strength), first three brackets, A quality, New York, discount	80%	80%
Car window glass (single strength), first three brackets, B quality, New York, discount	80%	80%
Car window glass (double strength, all eleven AA quality), New York discount	82 & 3%	82 & 3%
Waste, wool (according to grade), cents per lb.	11½ to 22	11½ to 22
Waste, cotton (100 lb. bale), cents per lb.	13 to 13½	13 to 13½
Asphalt, hot (150 tons minimum), per ton delivered	\$38.50	\$38.50
Asphalt, cold (150 tons minimum, pkgs. weighed in, F. O. B. plant, Maurer, N. J., per ton	\$42.50	\$42.50
Asphalt filler, per ton	\$45.00	\$45.00
Cement (earload lots), New York, per bbl.	\$3.20	\$3.20
Cement (earload lots), Chicago, per bbl.	\$3.34	\$3.34
Cement (earload lots), Seattle, per bbl.	\$3.68	\$3.68
Limeed oil (raw, 5 bbl. lots), New York, per gal	\$1.86	\$1.86
Limeed oil (boiled, 5 bbl. lots), New York, per gal	\$1.88	\$1.88
White lead (100 lb. keg), New York, cents per lb.	10½	10½
Turpentine (bbl. lots), New York, cents per gal	63	63

* Government price. † These prices are f. o. b. works, with boxing charges extra.

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will witness many strides toward the permanent settlement of many of the burning questions now agitating the industry. These developments will leave their mark upon the common practice for years to come. You will want to refer to them repeatedly long after the present transition period is over. Beginnings are always interesting. The beginnings of many of the movements now in the bud are unusually so. They spell REVOLUTION all over—they forecast the entire reshaping of electric railway practice—many of their elements that now appear to be of minor import will hereafter be regarded of weighty consequence.

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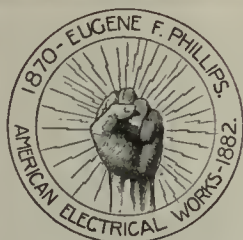
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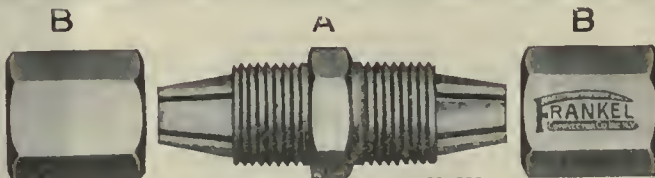
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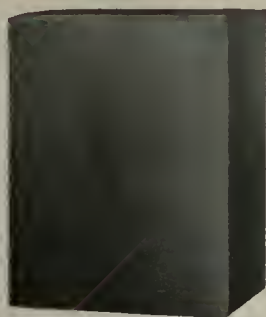


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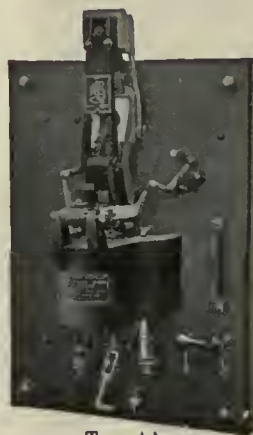
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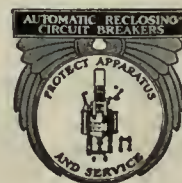
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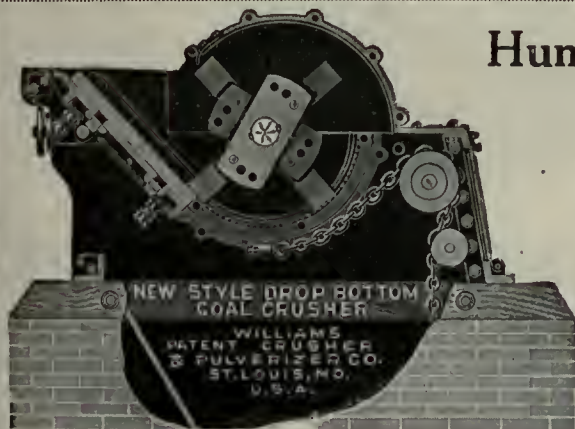
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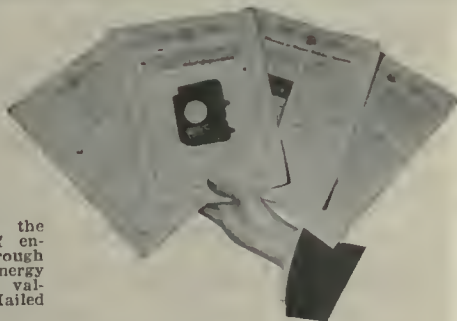
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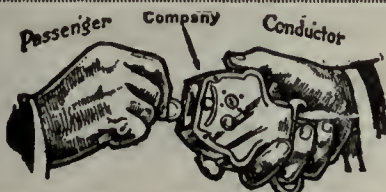
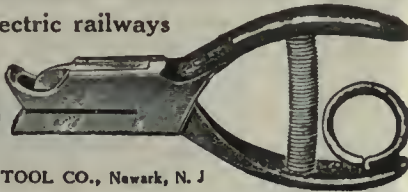
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STANWOOD STEPS—Self-cleaning, non-slippery, light.
Our products used on all leading railroads, on cars and stations. For details address:

AMERICAN MASON SAFETY TREAD CO., Lowell, Mass.
Branch Offices: Boston, New York City, Philadelphia.
Agencies to all principal cities.

The "Nycap=Exide" Battery

for

STORAGE BATTERY STREET CARS

THE ELECTRIC STORAGE BATTERY CO
PHILADELPHIA

Consolidated High Grade Products

Electric car heaters—thermostatic control—
pneumatic car door operators—buzzers, single-
stroke bells, starting signal lights—special re-
sistances.

CONSOLIDATED CAR HEATING CO., Albany New York

Settle the Car Heating Problem NOW!

Peter Smith heaters combine all the good points necessary to insure perfect heating and ventilation under all conditions. They operate more economically than any other heater. Now is the time to get ready for winter. Investigate Peter Smith heaters TODAY.

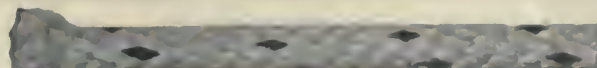
THE PETER SMITH HEATER COMPANY
1725 Mt. Elliott Ave., Detroit, Mich.

"Boyerized" Products Reduce Maintenance

Hemis Trucks Manganese Brake Heads
Case Hardened Brake Pins Manganese Transom Plates
Case Hardened Bushings Manganese Body Bushings
Case Hardened Nuts and Irons Axle Bearings
Bolts

Hemis Pins are absolutely smooth and true in diameter. We carry 40 different sizes of case hardened pins in stock. Samples furnished. Write for full data.

Bemis Car Truck Co., Springfield, Mass.



"Trade Mark Reg. U. S. Pat. Off."

Samson Spot Waterproof Trolley Cord

Made of fine cotton yarn braided hard and smooth. Inspected and guaranteed free from flaws. Proved to be the most durable and economical. Samples and information gladly sent.

1 **SAMSON CORDAGE WORKS, BOSTON, MASS.**

SEARCHLIGHT SECTION

Rotary Converters

25 Cycle, 550/600 Volts, D.C.

4—500 KW. Gen. Elec. Rotary Converter, type HC, form K, 600 Volts D.C., 834 amps. D.C., 4 pole, 750 RPM. With each rotary there are three 165 Kva. Gen. Elec. single phase transformers, type OI SC, 6600/5940 V primary, 430/286/143 V. secondary; also suitable switchboards.

1—300 KW. National, type RT, 6 pole, 550 V. D.C., 330 V. A.C., 500 RPM.

1—250 KW. General Electric Rotary Converter, type TC, form A, 3 phase, 4 pole, 550 V. D.C., 350 V. A.C., 750 RPM.

60 Cycle, 550/600 Volts, D.C.

1—400 KW. General Electric Rotary Converter, type HC, form P, 8 pole, 600 V. D.C., 430 V. A.C., 900 RPM.

MacGOVERN & COMPANY, Inc.

114 Liberty St., New York, N. Y.

ROTARY CONVERTERS

- 1—300-kw. Westinghouse Rotary Converter, 3-ph., 60-cy., 370-v. A.C., 575-v. D.C., 600 r.p.m.
3—300-kw. General Electric, 3-ph., 60-cy., 600-v., 1200 r.p.m. Rotary Converters with transformers.

TRANSFORMERS

- 3—750-kw. General Electric, 60-cy., O.I.S.C., 2200/4400 volts prim., 281/488 Y secy.
3—200-kva. General Electric, 60-cy., air blast type, 2200 volts prim., 370 secy.
6—185-kva. Westinghouse, O.I.S.C., 60-cy., 2200-v. prim., 370 secy.

ARCHER & BALDWIN, Inc.

114-118 Liberty St., New York, N.Y.

Telephone 4337-4338 Rector.

FOR SALE

Immediate Delivery

CAR BODIES

- 1—70-ft. Steel Combination Passenger Car Body, practically new.
1—50-ft. Express Car Body, new.

MOTORS

- 4—Westinghouse No. 305 Motors.
4—General Electric No. 203 Motors.

McGUIRE - CUMMINGS MFG. CO.

111 West Monroe St., Chicago, Ill.

Direct Current Belted Generator

1—500-kw., 550-V., 320 r.p.m. Cp. Wd. Westinghouse 3 bearing direct current generator.

DUQUESNE
Electric & Mfg. Co.

Write, wire or 'phone our nearest office, Pittsburgh, Pa., or 230 La Salle St., Chicago, Ill.

CLEVELAND ARMATURE WORKS

Cleveland, Ohio

Everything in the Line of Repairs to Electrical Machinery

Complete Armatures, New Armatures, Rewound Armature Cores, Armature Shafts, Armature Coils, Fields and Commutators.

Established 22 Years.

FIRST Get Bulletin 237—or, Wire ZELNICKER IN ST. LOUIS

Before buying or selling
RAILS

Locomotives—Cars—Tanks
Machinery, Piling, etc.

What have you for sale?

Keep your eye on the
Searchlight and your
advertisements in it.

CAR BARGAINS

OPEN and CLOSED
MOTOR and TRAIL

Write for Price and Full
Particulars to

**ELECTRIC
EQUIPMENT Co.**

601 Commonwealth Bldg. Phila. Pa.

FOR SALE

Equally as good as new, approximately fourteen miles 2/0 bare grooved

TROLLEY WIRE

and four miles 4/0 in long lengths, second-hand, but in first-class condition.

HENRY A. HITNER'S SONS CO.
Station "K," Philadelphia, Pa.

85 lb. A. S. C. E. Relays

16,000 tons—with Angle Bars to match. Available immediate shipment and centrally located. We positively own these Rails and offer same in carload lots and over 25,000 tons—Relays—sizes 25 lb. to 100 lb., in stock our Pittsburgh yards and vicinity. Immediate shipment guaranteed and prices very attractive. Carload and less than carload inquiries and orders solicited. Rails cut to lengths for structural purposes. Frogs, Switches, Bolts, Nuts, Spikes and all Accessories.

L. B. FOSTER COMPANY
Park Building, Pittsburgh, Pa.



SEARCHLIGHT SECTION

NEW EDISON STORAGE BATTERIES

Have 225 new cells A-10 Edison Nickel Steel Batteries. In fine condition. Never used. 1 8/10 volts per cell for heavy continuous work. Cannot break them down on overload. Fine for railway signaling work. electric light storage. Any purpose where reliable batteries are needed. *Will sell for less than half of cost price.* Write quick. Next to largest size made.

H. E. BUCKLEN, Receiver St. J. V. R.R. CO.
Elkhart, Indiana

Centrifugal Deep Well Pump

FOR SALE

One Hill Pump Co. centrifugal deep well Pump, consisting of 11—8-ft. well sections and 8 centrifugal pump bowls, driven by General Electric Co. 25-hp., 3-phase, 60-cycle, 2200-volt. Form "K" Vertical Motor, complete with starting compensator and overload relay. Motor and pump both new. Capacity 500-G.P.M. at 80-ft. head.

MADISON LIGHT & RAILWAY CO.
Madison, Ind.



Armature Coil Taping Machine

Saves Time,
Labor and Money

A boy can tape 40 coils for Westinghouse 12A Armature in an hour. Further particulars gladly furnished.

Geo. M. Griswold Machine Co.
New Haven, Conn.

60 Tons

7-in Girder Rails

P. S. Co. Section No. 238

HENRY LEVIS & CO.
Commercial Trust Bldg., Philadelphia, Pa.

WANTED

ROTARY CONVERTER

One Thousand (1000) kw., 6-phase, 60-cycle, 600-volt.

Also Three (3) 400-kva.

TRANSFORMERS

1-phase, 60-cycle, primary voltage 13,000.

William T. Twomey, 111 W. Monroe St., Chicago

Immediately Available

Complete equipment of
1000-kw., 600-volt, D.C.

POWER PLANT

Comprising two Cooper-Corliss engines, 90-r.p.m., direct connected to 500-kw. Westinghouse Generators.

WEST PENN POWER COMPANY
Pittsburg, Pa.

The Searchlight Advertising in This Paper

is read by men whose success depends upon thorough knowledge of means to an end—whether it be the securing of a good second-hand piece of apparatus at a moderate price, or an expert employee.

The Best Proof

of this is the variety of this journal's Searchlight ads. Without a constant and appreciable demand for such machinery or services, by its readers, the market place which these advertisements represent could not exist for any length of time.

Are you using the Searchlight Section?

SEARCHLIGHT SECTION

GET YOUR WANTS INTO THE "SEARCHLIGHT"

ADVERTISING RATES

Ads Set in Uniform Style

(Solid, in one paragraph, without display.)

THREE CENTS A WORD, minimum charge 50 cents an insertion, payable in advance, less 10 per cent. if one payment is made in advance for four continuous insertions—for advertisements under:

Positions Wanted	Vacation Work Wanted
Evening Work	Tutoring
Wanted	Salesman Wants Connections

FIVE CENTS A WORD, minimum charge \$1.50 an insertion, for advertisement under:

Agencies Wanted	Positions Vacant
Agents Wanted	Partner Wanted
Business Opportunities	Representations Wanted
Desk Room for Rent	Salesmen Wanted
Educational	Patents for Sale
Employment Agencies	Plants for Sale
Desk Room Wanted	Sub-Contracts Wanted
Foreign Business	Work Wanted

Miscellaneous for Sale, for Rent or Want Ads.

THIRTY CENTS A LINE, minimum five lines, for all undisplayed advertisements set with a paragraph for each item or tabulated.

THREE DOLLARS AND SIXTY CENTS AN INCH for advertisements for bids (Official Proposals).

Ads Set in Display Type

(Individual space, within border rules.)

Space for these advertisements is sold by the inch. Each page contains 27 inches. The rate per inch is based on the total number of inches to be used—that is, the number of inches the advertisement is to occupy multiplied by the number of insertions it is to receive. For instance, a 2-inch advertisement in 2 issues earns the 4-inch rate of \$3.00 an inch. A 1-inch space in 4 issues, or a 4-inch space in one issue, also earn the 4-inch rate.

SCHEDULE OF RATES

1 to 3 in., \$3.00 an in.	15 to 26 in., \$2.70 an in.
4 to 7 in., 2.90 an in.	27 to 49 in., 2.60 an in.
8 to 14 in., 2.80 an in.	50 to 99 in., 2.50 an in.

Rates for larger space furnished on request.

*For quick and satisfactory results
tell the reader everything that
he will want to know.*

INFORMATION

ALLOW FIVE WORDS for the address, if replies are to a box number in care of any of our offices. There is no extra charge for forwarding replies.

IN REPLYING TO ADS, do not enclose original testimonials or anything that you may want returned. State your experience and qualifications in as concise and neat a manner as possible and enclose copies of your testimonials.

BE CAREFUL TO PUT ON ENVELOPE, when answering any "blind," ad, the box number in the ad, the name of the paper, and also the local address of office to which reply is sent:

36th St., at 10th Ave.,	New York
1570 Old Colony Bldg.,	Chicago
657 Leader-News Bldg.,	Cleveland
935 Real Estate Trust Bldg.,	Philadelphia
1041 Newhouse Bldg.,	Salt Lake City
501 Rialto Bldg.,	Sao Francisco

WHEN ADVERTISING MACHINERY, use your own name and address—or a local address of some kind—so that the readers can wire direct and get quick replies. We advise also that you state in your advertisement the present location of plant that is offered for sale, or point of delivery provided you are in the market for equipment.

TO SIGN YOUR NAME and address to your advertisement begets the confidence of the reader and facilitates receiving replies. You can, however, obviate delay in receiving answers by signing your ad. only with initials (your own or others), care of your home, your office or a post-office box number in your city.

POSITIONS VACANT

ARMATURE winder wanted immediately. P-224, Elec. Ry Journal, Chicago.

CAR barn foreman wanted at once. P-225, Elec. Ry. Journal, Chicago.

CHIEF Clerk to Auditor wanted. Must be familiar with Interstate Classifications, and a live wire capable of taking entire charge of Auditing Department, City and Interurban property. State age, salary required, education and experience. P-222, Elec. Ry. Journal, Chicago.

DRAFTSMAN, experienced on electrical power plant or sub-station work. Good future for men of ability. New York & Queens Electric Light & Power Co., 444 Jackson Ave., Long Island City, New York.

GRADUATE electrical engineer wanted. Competent to design, construct and operate transmission lines up to 66,000 volts, general power and railway distribution including bonding, electrolysis and electric signals. Also to act in a consulting capacity in reference to all electrical matters pertaining to power houses, substations, car equipments and all other electrical matters in connection with a large electric railway and power system. Address, giving nationality, age, experience, salary wanted and references. General Manager, The Shore Line Electric Railway Company, 362 Main St., Norwich, Conn.

TRAVELLING Auditor wanted to check Freight and Ticket Agents' Accounts. State experience, age and salary expected, and give references. P-221, Elec. Ry. Journal, Chicago.

MASTER mechanic or superintendent of Rolling Stock for electric urban and interurban system operating 600 passenger and freight cars. He should primarily be thoroughly familiar with modern ideas of shop practice, planning systems and electrical equipment and secondarily should have experience with electric railway rolling stock. P-229, Elec. Ry. Journal.

RAILWAY armature winder wanted; experienced in armature winding and repair work. Gary Street Railway Company, Gary, Indiana.

POSITIONS VACANT

SUPERINTENDENT of transportation wanted by system operating city and suburban lines. Good opportunity for an experienced operating man. State fully experience and age. P-228, Elec. Ry. Journal, Phila., Pa.

POSITIONS WANTED

AUDITOR solicits change; thirteen years' experience in Street Railway Accounting; age 35; married; references. PW-223, Elec. Ry. Journal.

CLAIM agent, regarded as one of the ablest and most successful, one of the leading experts in accident prevention and high class transportation man, desires change. Particularly desirous of becoming attached to a property in which the accident expense is regarded as unreasonably high. Would undertake to bring about substantial reduction and can do so within a reasonably short time. Highest references. PW-217, Elec. Ry. Journal.

ENGINEER—Mechanical graduate, specialized in rolling stock, open Sept. 1st for temporary or permanent position with electric railway or manufacturing company, maintenance, construction and efficiency work. Investigation and supervision. For full particulars address PW-227, Elec. Ry. Journal, New York.

OPERATING EXECUTIVE

with 6 years as Superintendent and 7 years as Manager of steel and interurban railway, open for engagement. Thoroughly conversant with modern practice and have wide knowledge of working methods and economies necessary to meet present rapid changing conditions. Electrical and mechanical engineer. Wide experience in technical and non-technical subjects. Energetic, Married, Methodist. A good man to meet the public. Now employed but desirous of assuming greater responsibility. Best of references.

PW218—Electrical Railway Journal
1570 Old Colony Bldg., Chicago, Ill.

The Searchlight Advertising in This Paper

is read by men whose success depends upon thorough knowledge of means to an end—whether it be the securing of a good second-hand piece of apparatus at a moderate price, or an expert employee.

The Best Proof

of this is the variety of this journal's Searchlight ads. Without a constant and appreciable demand for such machinery or services, by its readers, the market-place which these advertisements represent could not exist for any length of time.

Are you using the Searchlight Section?

DOUBLE TRUCK OPEN CARS

3—13 Bench Laconia.
2—15 Bench Wason.
1—Double-truck, double-end Snow Plow.

Excellent Condition.
Price Reasonable.

FS—200, Electric Railway Journal
10th Ave. at 30th St., New York

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with
Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car.
Collier, Inc., Barron G.

Alloys Steel & Iron. (See also
Bearings & Bearing Metals
Titanium Alloy Mfg. Co.

Alr Rectifiers
Holden & White, Inc.

Anchor, Gay.
Electric Service Supplies Co.
Holden & White, Inc.
Johns-Manville Co., H. W.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

Anti-Climbers
Railway Improvement Co.

Automobiles and Buses.
Brill Co., The J. G.

Axle Straighteners.
Columbia M. W. & M. I. Co.

Axles, Car Wheel.
Bemis Car Truck Co.
Brill Co., The J. G.
Carnegie Steel Co.
National Railway Appliance Co.
St. Louis Car Co.
Standard Steel Works Co.
Westinghouse Elec. & M. Co.

Babbitting Devices.
Columbia M. W. & M. I. Co.

Badges and Buttons.
Electric Service Supplies Co.
International Register Co., The

Batteries, Dry.
Johns-Manville Co., H. W.
Nichols-Lintern Co.

Batteries, Storage.
Electric Storage Battery Co.

Bearings and Bearing Metals.
Ajax Metal Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
More-Jones Brass & Metal Co.
St. Louis Car Co.
Westinghouse Elec. & M. Co.

Bearings, Center and Roller Hdn.
Holden & White, Inc.

Bearings, Roller and Rail.
Gurney Ball-Bearing Co.

Bells and Bells.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
St. Louis Car Co.

Benders, Rail.
Niles-Bement-Pond Co.
Zelnicker, Walter A., Supply Co., Inc.

Boilers.
Babcock & Wilcox Co.

Boiler Cleaning Compounds.
Johns-Manville Co., H. W.

Boiler Coverings.
Johns-Manville Co., H. W.

Boiler Tubes.
National Tube Co.

Boat Testers.
American Steel & Wire Co.

Bonding Apparatus.
American Steel & Wire Co.
Electric Railway Improvement Co.
Electric Service Supplies Co.
Imperial Brass Mfg. Co.
Ohio Brass Co.

Bonds, Rail.
American Steel & Wire Co.
Electric Railway Improvement Co.
Electric Service Supplies Co.
General Electric Co.
Johns-Manville Co., H. W.
Lincoln Bouding Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

Boring Tools, Car Wheel.
Niles-Bement-Pond Co.

Brackets and Cross Arms. (See
also Poles, Ties, Posts, Etc.)
American Bridge Co.
Hubbard & Co.
Lindsley Bros. Co.
Ohio Brass Co.

Brake Adjusters.
Holden & White, Inc.
Westinghouse Traction Brake Co.

Brake Shoes.
Amer. Brake Shoe & Fdry. Co.
Barbour-Stockwell Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

Brakes, Brake Systems and Brake Parts.
Allis-Chalmers Mfg. Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
General Electric Co.
Holden & White, Inc.
National Brake Co.
St. Louis Car Co.
Westinghouse Trac. B. Co.

Bridges & Buildings
American Bridge Co.

Brooms, Track, Steel or Rattan.
Zelnicker, Walter A., Supply Co., Inc.

Brush Holders.
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eureka Co.

Brushes, Carbon.
General Electric Co.
Jeandron, W. J.
Morgan Crucible Co.
National Carbon Co., Inc.
United States Graphite Co.
Westinghouse Elec. & M. Co.

Brushes, Graphite.
United States Graphite Co.

Bunkers, Coal
American Bridge Co.

Bushings, Case Hardened & Mangnse
Bemis Car Truck Co.

Cables. (See Wires and Cables.)
Carbon Brushes. (See Brushes, Carbon.)

Car Equipment. (For Fenders, Heaters, Registers, Wheels, etc.—See those headings.)

Car Trimmings. (For Curtains, Registers, Doors, Seats, etc.—See those headings.)

Cars, Passenger, Freight, Express, etc.
American Car Co.
Brill Co., The J. G.
Kuhlman Car Co., O. C.
McQuinn-Cummings Mfg. Co.
St. Louis Car Co.
Wagon Mfg. Co.

Cars, Second Hand.
Electric Equipment Co.

Cars, Self-Propelled.
Electric Storage Battery Co.
General Electric Co.

Counting Recorders
Railway Improvement Co.

Castings, Brass, Composition or Copper.
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eureka Co.
More-Jones Brass & Metal Co.

Castings, Gray Iron and Steel.
American Bridge Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Horne Mfg. Co.
St. Louis Car Co.
Standard Steel Works Co.
Union Spring & Mfg. Co.

Castings, Malleable and Brass.
Amer. Brake Shoe & Fdry. Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

Catchers and Retrievers, Trolley.
Electric Service Supplies Co.
Holden & White, Inc.
Ohio Brass Co.
Wood Co., Chas. N.

Celling, Car.—(See Head Lining.)

Circuit Breakers.
Automatic Reclosing Circuit Breaker Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Clamps and Connectors for Wires and Cables.
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

Cleaners and Scrapers Track.—(See also Snow-Plows, Sweepers and Brooms.)
Brill Co., The J. G.
Ohio Brass Co.

Clusters and Sockets.
General Electric Co.

Coal and Ash Handling.—(See Conveying and Hoisting Machinery.)

Coal Crushers
Williams Patent Crusher & Pulverizer Co.

Coil Banding and Winding Machinery.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

Coils, Armature and Field.
Cleveland Armature Works.
Columbia M. W. & M. I. Co.
D & W Fuse Co.
General Electric Co.
Independent Lamp & Wire Co.
Westinghouse Elec. & M. Co.

Coils, Choke and Kieking.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Coin-Counting Machines.
International Register Co., The

Commutator Sitters.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.
Wood Co., Chas. N.
Commutator Truing Devices.
General Electric Co.

Commutators or Parts.
Cleveland Armature Works.
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Compressors, Air.
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Trac. B. Co.

Condensers
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Conduits, Underground.
Johns-Manville Co., H. W.

Connectors, Solderless.
Westinghouse Elec. & Mfg. Co.

Controller Regulators.
Electric Service Supplies Co.

Controllers or Parts.
Allis-Chalmers Mfg. Co.
Columbia M. W. & M. I. Co.
General Electric Co.
Johns-Manville Co., H. W.
Westinghouse Elec. & Mfg. Co.

Controlling Systems.
General Electric Co.
Westinghouse Elec. & Mfg. Co.
Converters, Rotary.
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Conveying and Hoisting Machinery.
American Bridge Co.
Columbia M. W. & M. I. Co.
Green Engr. Co.

Cord, Bell, Trolley, Register, etc.
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The
Samson Cordage Works

Cord Connectors and Couplers.
Electric Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.

Couplers, Car.
Brill Co., The J. G.
Ohio Brass Co.
Van Dorn Coupler Co.
Westinghouse Trac. B. Co.

Cranes. (See also Hoists.)
Allis-Chalmers Mfg. Co.
Niles-Bement-Pond Co.

Cresosoting. (See Wood Preservation.)

Cross Arms. (See Brackets.)

Crossing Foundations.
International Steel Tie Co.

Crossing Signals. (See Signals, Crossing.)

Crossings, Track. (See Track, Special Work.)

Crushers, Rock
Allis-Chalmers Mfg. Co.

Culverts
Canton Culvert & Silo Co.

Curtains and Curtain Fixtures.
Brill Co., The J. G.
Electric Service Supplies Co.
St. Louis Car Co.

Cutting Apparatus, Oxy-Acetylene.
Imperial Brass Mfg. Co.
Milburn Co., The Alex.

Derailing Devices. (See also Track Work.)
Cleveland Frog & Crossing Co.
Reading Specialties Co.

Destination Signs.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Western Electric Co.

Detective Service.
Witch Service, P. Edward



Model 370—A.C. and D.C. Ammeter

One of the Portable Electrodynamometer Group, which also includes Model 310 Single Phase and D.C. Wattmeter, Model 329 Polyphase Wattmeter and Model 341 A.C. and D.C. Voltmeter.

The characteristics of the group are extreme accuracy (guaranteed within a fraction of 1½ full scale value), adaptability for use on circuits of any commercial frequency and any wave form, great overload capacity, low moment of inertia, effective damping and shielding, and the legibility and remarkable uniformity of the hand calibrated scales.

“For Active Service”

From a purely scientific standpoint, this Company is proud of its contributions to the theory of Electrical Measurement. It is still more proud of

Weston

Indicating Instruments

In design, in material, in their structural perfection, they are thoroughly worthy to represent Weston ideas and ideals in the field of active service.

Weston Indicating Instruments include a great variety of groups for portable or switchboard service on A. C. or D. C. Circuits, Instruments designed expressly for testing and laboratory use, for motor car and boat electrical systems, and many others for special purposes. Write for Bulletins or Catalogs describing those which interest you

Weston Electrical Instrument Company
21 Weston Ave., Newark, N. J.

New York
Philadelphia
Pittsburgh
Cleveland
Cincinnati

Chicago
Boston
Buffalo
Richmond
San Francisco
Florence

Denver
Detroit
St. Louis
Toronto
Winnipeg
Johannesburg, S. Africa

Montreal
Vancouver
London
Paris
Petrograd

B. A. Hegeman, Jr., President; Charles C. Castle, First Vice-President; E. D. Hillman, Secretary and Engineer; Harold A. Hegeman, Vice-President and Treasurer; Fred C. Dunham, Assistant to President.

NATIONAL RAILWAY APPLIANCE COMPANY

50 East 42d St., NEW YORK CITY

Hegeman-Castle Corporation Chicago
National Railway Appliance Co., Washington, D. C.

RAILWAY SUPPLIES

Selling Agents for Tool Steel Gears and Pinions, Johnson Fare Boxes, Perry Slide Bearings, Hartman Centering Center Plates, Wessco Trolley Bases, Rimco Rubber Insulated Pliers, Garland Ventilators, Electric Arc Welders, High Class Railway Valves and Steamers, Axes and Forgings.

Special Agents for Tool Steel Gear & Pinion Co., Rubber Insulated Metals Corp., Johnson Fare Box Co. C. & C. Electric & Mfg. Co., Holden & White, Inc. General Agents for Anglo-American Varnish Co., Eastern Agents for Union Fibre Co., Eastern & Southern Agents for Laclede Steel Co.



Get those coils back into service—quick!

Don't let LABOR SHORTAGE hold them up in your coil department. You can't get more men—but you can save time and money by sending the coils to us for re-insulation with

SALAMANDER Pure Asbestos

We will return them promptly—better insulated and more durable than when new. “Salamander” asbestos wire excels in insulating value and cannot burn out under the severest overload. Leading electric railways are our best customers. Write us for details now.

Independent Lamp & Wire Co., Inc.

OFFICES:

1737 Broadway, New York

FACTORIES:

York, Pa., and Weehawken, N. J.

MORGANITE BRUSHES

for good commutation

THE MORGAN CRUCIBLE COMPANY

MAIN OFFICE and FACTORY:

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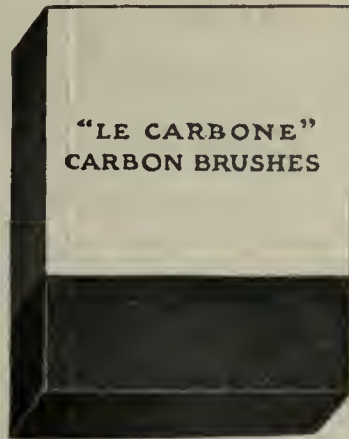
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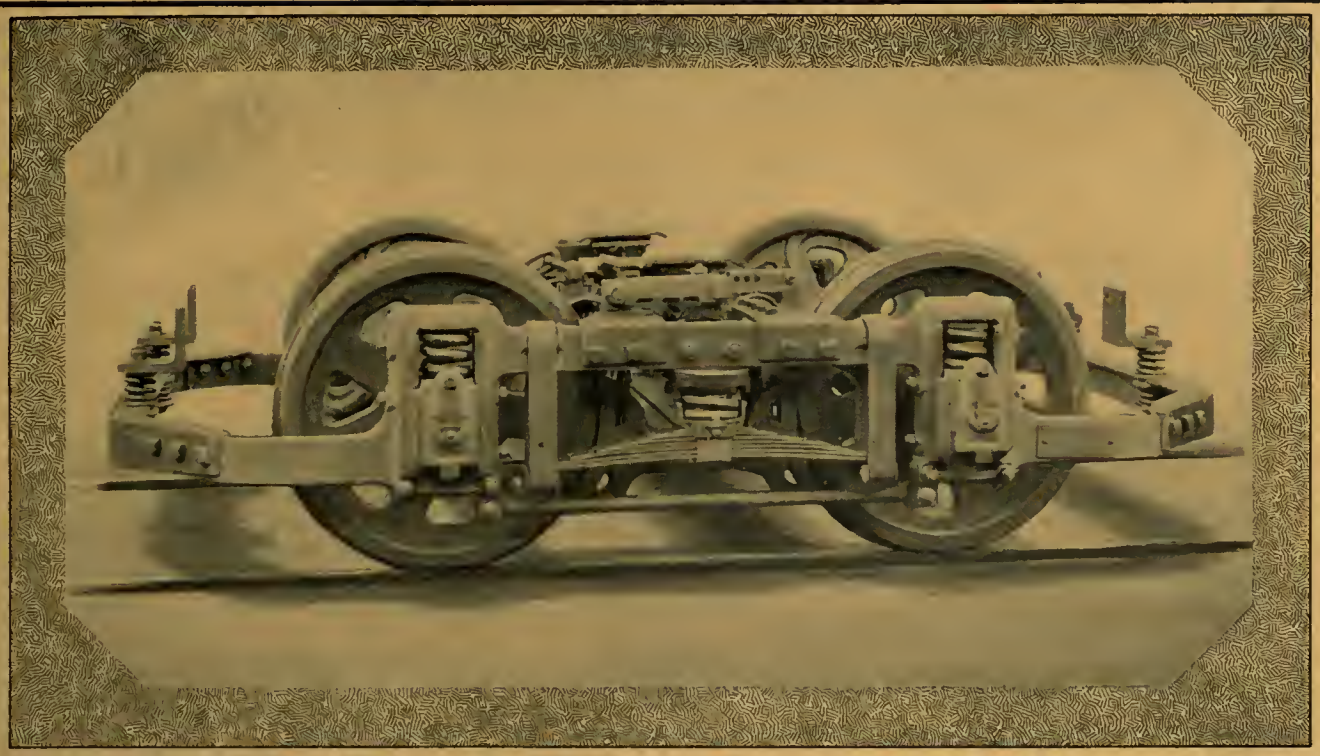


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ELECTRIC RAILWAY JOURNAL

August 17, 1918



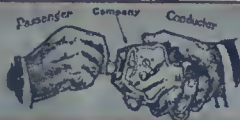
The ROOKE AUTOMATIC REGISTER for the collection of ZONE FARES OR NEW FARE UNITS

The ROOKE Register is not a one-type-only, one-coin-only or one-idea-only proposition. The principle of collection is always the same, i. e.—*direct, instantaneous registration by the passenger*. The capacity of the ROOKE Register, however, to properly receive and classify quarters, nickels, dimes, pennies or metal tickets in various combinations, varies to meet almost any set of auditing requirements.

In this busy city district, as pictured, a type of three-counter ROOKE Register covers a nickel and two-cent zone service for 400,000 people paying \$6,000,000 annually.

The ROOKE is wonderfully versatile. It fits in with any type of car construction for the collection of almost any combination of fare units. **YOU SHOULD INVESTIGATE.**

ROOKE AUTOMATIC
REGISTER COMPANY



PROVIDENCE,
RHODE ISLAND



Snow Sweepers

"JOE," said the General Manager to the Superintendent. "I have held up your requisition for four equipments. I do not appreciate why you need them."

"Boss," replied Joe, "that lot of motors is for our new snow sweepers and I want good, old reliable Westinghouse No. 306 motors for the work."

"But," remarked the General Manager, "it has been common practice to use some old, obsolete motors on snow sweepers, and since we are retiring a large number of these, I had figured on using them on our new sweepers."

"Yes, that's true," continued Joe, "but, as a matter of fact, it's a big mistake. We use the snow sweepers only a comparatively small number of times during the year. When we do use them, however, we want to be sure they will go out, and stay out, until the snow is cleared. A motor failure on a snow sweeper puts the whole outfit out of business, and is likely to tie up several of our lines that were depending on it."

"I have come to the conclusion that on our snow sweepers we need the most reliable equipment we can get, and that's why I mentioned Westinghouse No. 306 motors."

"Joe," replied the General Manager, "you are absolutely right about that. I had not thought of it in that light before. I will approve the requisition."

Westinghouse Electric
East Pittsburgh



& Manufacturing Co.
Pennsylvania

Electric Railway Journal

H. W. BLAKE, *Editor*

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the change takes place.
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ter June 23, 1908, at the Post Office at New
York, under the Act of March 3, 1879.

Air Brakes for Every Service



"SAFETY" Car, Northern Texas Traction Co.
Fort Worth, Texas, Weight, 14,000 lbs.
Semi-Automatic Brake.

We supply air brakes for all kinds of electric railway cars from the light weight, "SAFETY" car to those in heavy, multiple-unit train service.

We recommend semi-automatic schedules for single city cars, with and without occasional trailers;

automatic brakes for trains of two or three cars in city, suburban and interurban service; and universal variable-load brake, electrically controlled, for elevated and subway trains.

Train on the New York Municipal Railway. Car weight, 87,000 lbs. Electro-Pneumatic, Variable Load Brake.



Westinghouse Traction Brake Company
General Offices and Works, Wilmerding, Pa.

Atlanta, Ga.
Boston, Mass.
Chicago, Ill.
Columbus, O.

Denver, Col.
Houston, Tex.
Los Angeles, Cal.



Mexico City
New York, N. Y.
Pittsburgh, Pa.

San Francisco
Seattle, Wash.
St. Louis, Mo.
St. Paul, Minn.

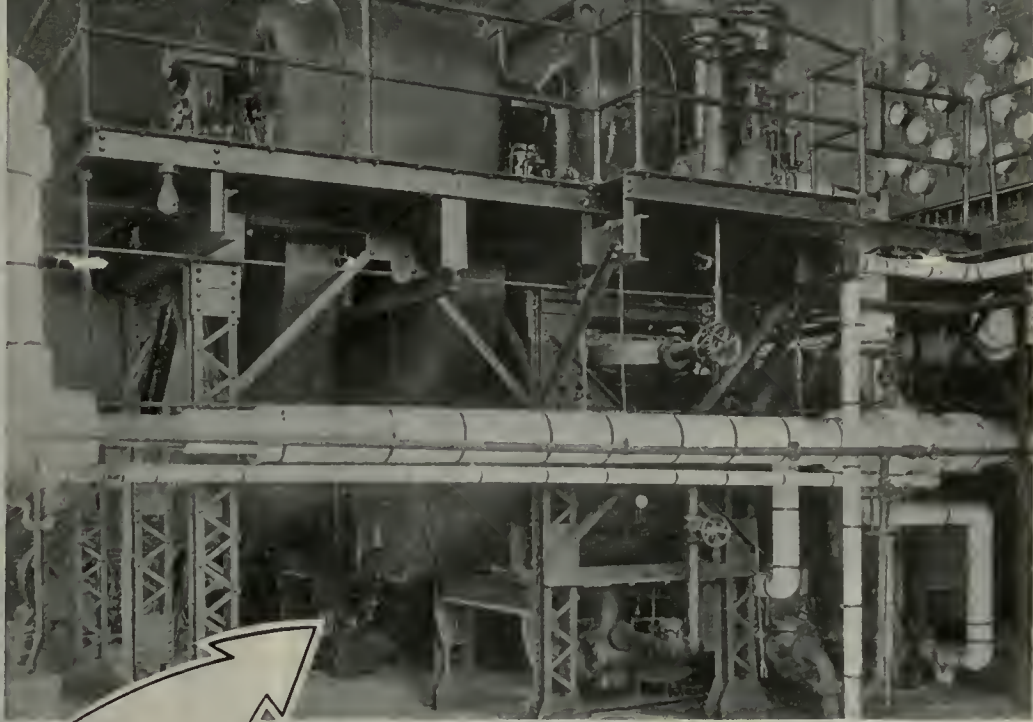
Brake Building our Business for a Lifetime

Features
of the
Unit Type
Surface
Condenser:

- May be located directly beneath turbine.
- Air, Circulating and Condensate Pump directly underneath condenser, and all runners mounted on one shaft.
- One turbine drive for all pumps.
- Suction and discharge can be made in any direction to suit local conditions.
- Few joints and minimum amount of piping.
- No reciprocating parts to wear.
- Utmost simplicity of construction in every detail.
- Unsurpassed in the ability to maintain high vacuum constantly.

*Unit
Type
Surface
Condenser*

*500 Kw. Westinghouse Turbine-Generator and
Westinghouse Unit Type Surface Condenser
La Cede Gas Light Co.*



Floor space limitations often make—

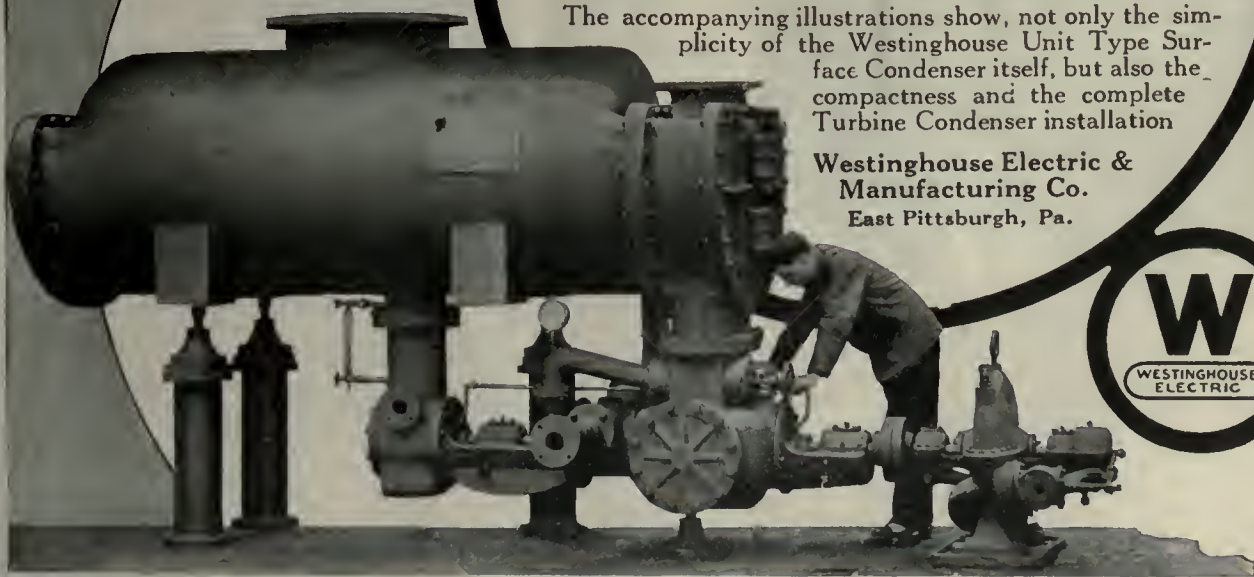
COMPACTNESS

a consideration of first importance in the selection of power equipment.

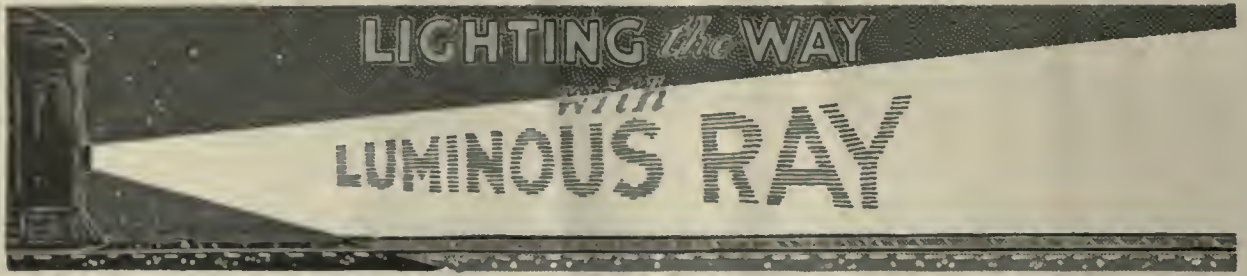
Compactness is often obtained only at a sacrifice in accessibility.

The accompanying illustrations show, not only the simplicity of the Westinghouse Unit Type Surface Condenser itself, but also the compactness and the complete Turbine Condenser installation

Westinghouse Electric &
Manufacturing Co.
East Pittsburgh, Pa.



Westinghouse

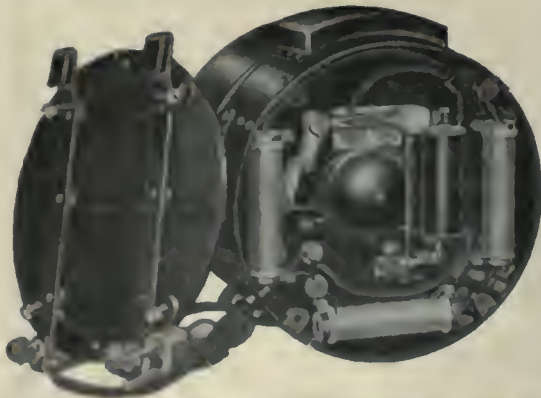


Imperial Luminous Arcs

Steady Service with Minimum Care



Type LAA—Luminous Arc and Incandescent. (Incandescent lamps are used when running through lighted streets of cities or villages.)



Type LAA—Rear door open showing mechanism mounted on air-tight partition.

Imperial Luminous Arcs are unaffected by considerable variations in voltage. They maintain a powerful, dependable beam of light.

Imperial Luminous Arcs are as simple as good operation permits. Each part has a purpose. Each part is sturdy. In other words, the mechanism is well-nigh trouble proof.

The working members are protected. The case is divided by an air-tight partition. In the front compartment are the electrodes.

In the rear, away from the fumes and deposits, is the mechanism. This construction makes maintenance easy.

The partition also gives added stiffness to the already sturdy case.

There are several different types of Crouse-Hinds Imperial Luminous Arcs, Carbon Arcs and Incandescents. Discuss your conditions with our headlight specialists.

The Ohio Brass Company, Mansfield, Ohio

New York

Philadelphia

Pittsburgh

Chicago

San Francisco

Los Angeles

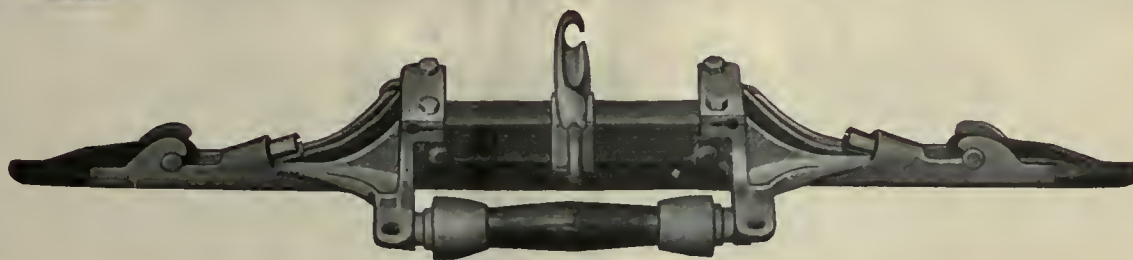
General Sales Agents in United States

for Crouse-Hinds Imperial Headlights



PRODUCTS

Quality First



Product of Experience Plus Progress

This O-B Section Insulator started with the best features of former side bar breakers. Still retaining the original advantages of the old design it has in addition O-B Cam Tips, self-tightening trolley wire chucks, fibre runner pieces, etc.

O-B Bronze Cam Tips simplify installation. The tip is slipped under the hooks upside down, then turned over and down on the wire, the lips clinched and the job is done. They take the main shock of the trolley wheel approach. They are easily renewed.

The Type A Form 3 Insulator is stronger than the trolley wire. The wire is held in chucks. The greater the strain the tighter the chucks grip

the wire. If the strain is relaxed the chucks do not loosen.

Fibre runner piece with its bronze arcing clips is renewable as a unit by taking out two bolts. A slot in the central beam holds the runner firm and steady.

Tension is carried by two sturdy wood strains. Since these are in same horizontal plane as wire, the device does not buckle or tilt.

Feeder wires are carried straight through feeder lugs without taking off taps. Both breakers are fed from same wires on double track or double trolley. The O-B Type A Form 3 may be installed on a standard hanger or directly on span wire.

Send for "Saving Time on the Line."

THE OHIO BRASS CO., Mansfield, Ohio

New York

Philadelphia

Pittsburgh

Chicago

San Francisco

Los Angeles

Phono-Electric

At Richmond



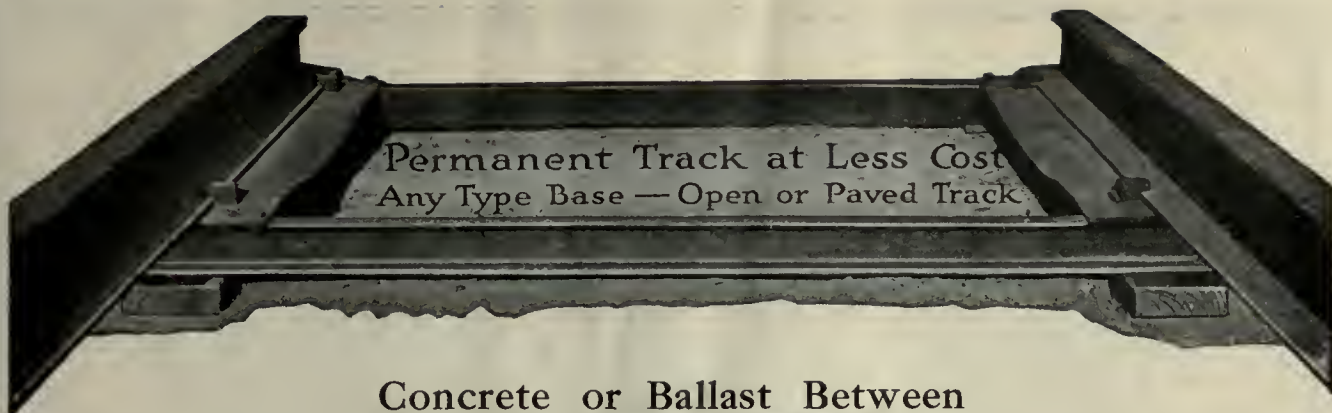
If you are traveling across the U. S. A. you can't help noticing how much Phono-Electric Trolley Wire is in use.

There is Richmond, with installations on Main Street between Second and Twenty-First, West Broad Street between Harrison and Robinson Streets and Seventh Street between Broad Street and James River.

Aside from smaller scattered sections Phono-Electric trolley wire always enters by way of the hardest service first—The West Broad Street installation of No. 00 wire shown (1 mile long) has been up since 1908.

Isn't that excellent proof of its superior durability?

Bridgeport Brass Company
Bridgeport **Connecticut**



Concrete or Ballast Between
Wooden Ties is an Expense

INTERNATIONAL STEEL TWIN TIES

Are An Investment

Not Temporary — But Permanent

International Steel Twin Ties pay good returns on the investment—for example:

50% reduction in excavation and concrete quantities over that required for similar wooden tie construction.

50% reduction over that required for any other form of track construction.

Maintenance is kept at the lowest point—because of large tie-bearing area. Couple this with permanent materials and long life is the result.

Wooden ties are a constant source of expense, because of the track material and

labor necessary to repair or replace them frequently.

On the contrary, there is a specific reason—a sound engineering reason for every ounce of metal in a Steel Twin Tie.

Actual tests over a period of years has proved beyond question the truth of our claims for labor and material savings.

Consider International Steel Twin Ties seriously and wisdom will prompt you to decide that *now* is a good time to invest rather than expend. At least, ask for the evidence.

Prompt deliveries made from stock.

The International Steel Tie Company

Manufacturers of Steel Twin Ties and Crossing Foundations

General Sales Office and Works: Cleveland, Ohio

REPRESENTATIVES:

Western Eng'g Sales Co.,
Los Angeles, Cal.

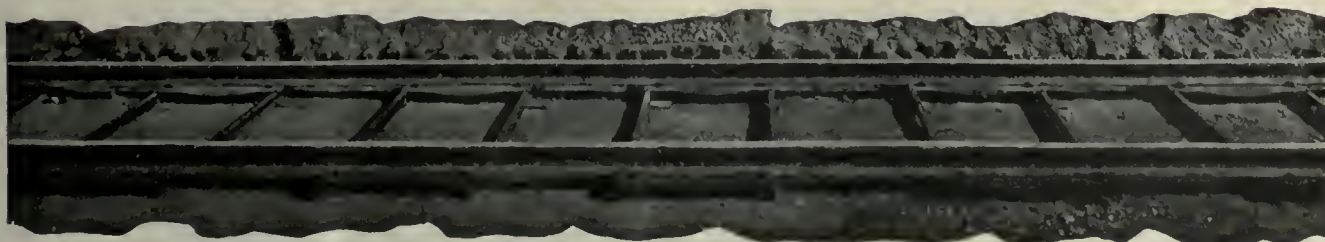
San Francisco, Cal.
Seattle, Wash.

R. J. Cooper Co.,
Salt Lake City, Utah.

J. E. Lewis & Co.,
Dallas, Texas.

Maurice Joy,
Philadelphia.

William H. Ziegler,
Minneapolis, Minn.



2500 Overhead Frogs In One Order—Largest Ever Placed



DREW Gets It

On July 20th the Chicago Surface Lines issued the largest order for overhead frogs and switches ever placed at one time for immediate delivery, a total of two thousand five hundred.

This is a notable order, not only because of size, but also because it is a tribute to material which has stood up for years in the hardest overhead service in the World—the Chicago Loop.

The entire order was placed with the Drew Electric & Manufacturing Company through its Chicago representative, Holden & White, Inc., and calls for Drew galvanized malleable iron. Moreover, the Surface Lines also purchased one thousand Drew overhead crossovers on July 5th.

Large orders, such as these, are proof of satisfactory results given by Drew overhead line material and should lead other railways to specify DREW for Economy and Service.

Send for new Catalog 18—Free

DREW ELECTRIC & MFG. COMPANY



The Mark of Quality

Offices and Works:
1016 E. Michigan St., Indianapolis, Ind.

Chicago Office:
Holden & White, Inc., 343 So. Dearborn St.



The Mark of Quality



Car operated by the Richmond Light and Railroad Co., New Brighton, N. Y.

Illuminated Car Signs and "Golden Glow" Headlights—Sure Signs of a Progressive Railway Company

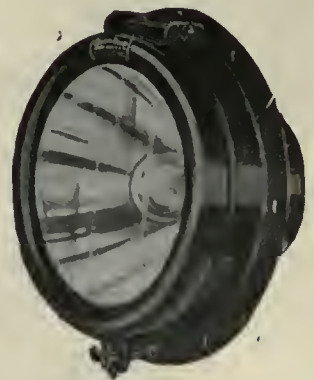
The Richmond Light & Railroad Company know well the great value of Keystone and Hunter Illuminated Destination Signs. Their signs attract riders for them and advertise their service, and besides, make easy the re-routing of their cars.

Their "Golden Glow" Headlights project powerful but soft non-blinding beams of golden light, thus lighting up a path of safety before their cars. In this manner "Golden Glow" Headlights inspire a certain confidence in both operators and riders.

Write for complete data on this equipment.



Typical Keystone Type Sign



"Golden Glow" Headlight
Type SR-95

ELECTRIC SERVICE SUPPLIES CO.

Manufacturer of Railway Material and Electrical Supplies

PHILADELPHIA
17th and Cambria Sts.

NEW YORK
50 Church St.

CHICAGO
Monadnock Bldg.

Canadian Distributors: Lyman Tube & Supply Co., Montreal, Toronto, Winnipeg.

Every Car in Omaha is Equipped With Anderson Slack Adjusters

In Service for 8 Years

On the Omaha & Council Bluffs Street Railway, Anderson automatic brake slack adjusters have stood the best possible test—that of long-time service. For 8 years they have been guardians of Omaha's brakes and there has never been any question of their dependability.

Care of brakes costs the Omaha company little money and little labor, for every car is equipped with Anderson adjusters. Consequently, brake setting is eliminated from nightly inspection costs and the only attention necessary, except for watchfulness over pins, cotters, etc., is when new shoes are needed.

Anderson adjusters reduce brake shoe wear, accompanied by less wheel wear, less armature maintenance cost and less compressor use. They decrease time of cars out of service for bad order brakes and make all cars brake alike.

Notice this unretouched photograph of an Anderson adjuster on a Brill 27-G truck at Omaha. It is covered with dirt but that does not affect it. The thread where it unscrews *out of* the dead lever casting to lengthen the adjuster is clean. Mud, snow or ice do not prevent the successful operation of this device. Moreover, false slackness or worn truck parts do not interfere with its reliable performance.

*Send for further description
and our trial offer.*

How They Work

The Anderson adjuster consists essentially of 3 parts—a measuring means, an operating means, and an adjusting means. Fingers on a rocker arm measure the brake lever travel. As shoes wear and live lever travel increases, these fingers measure the amount of slack and thru the rocker arm actuate a friction clutch. This clutch, the operating means, turns and screws the main threaded shaft, increasing the length and thus taking up the slackness.

There is a hex nut on the shaft and to reset the adjuster for new shoes, turn the shaft with a wrench—a simple method.

These adjusters take the place of ordinary turnbuckles but the threaded shaft *does not wear out* as turnbuckles do because there are no lock or jam nuts to wear the threads. The adjusters require no attention. They can be put on almost any truck in 30 minutes.

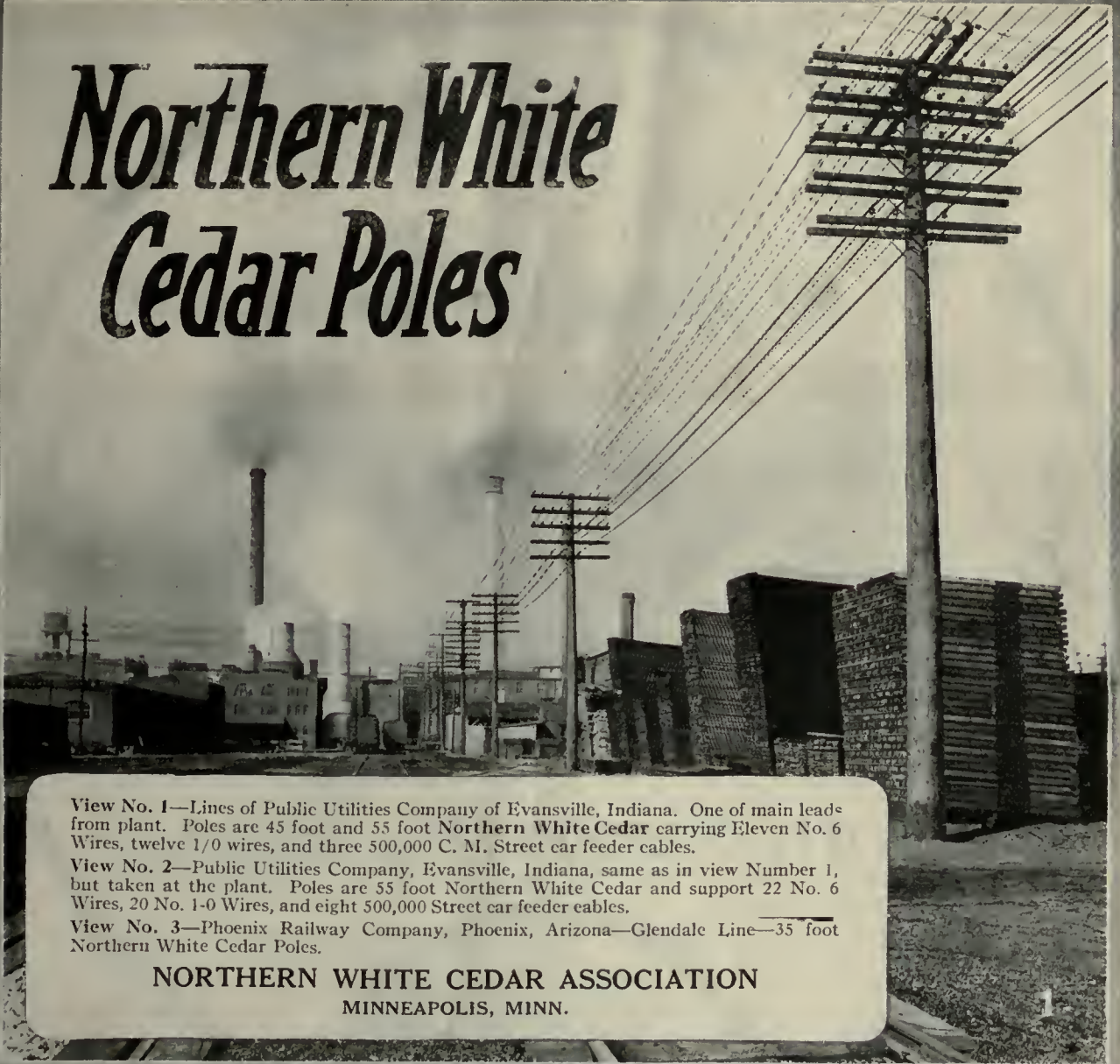


Holden & White Inc.

817 Fisher Building, Chicago, Ill.

National Railway Appliance Co., New York and Washington; C. E. A. Carr Co., Toronto; W. M. McClintock, St. Paul; Alfred Connor, Denver; O. H. Davidson Equipment Co., Salt Lake City; F. F. Bodier, San Francisco; S. I. Wallis, Los Angeles.

Northern White Cedar Poles



View No. 1—Lines of Public Utilities Company of Evansville, Indiana. One of main leads from plant. Poles are 45 foot and 55 foot Northern White Cedar carrying Eleven No. 6 Wires, twelve 1/0 wires, and three 500,000 C. M. Street car feeder cables.

View No. 2—Public Utilities Company, Evansville, Indiana, same as in view Number 1, but taken at the plant. Poles are 55 foot Northern White Cedar and support 22 No. 6 Wires, 20 No. 1-0 Wires, and eight 500,000 Street car feeder cables.

View No. 3—Phoenix Railway Company, Phoenix, Arizona—Glendale Line—35 foot Northern White Cedar Poles.

NORTHERN WHITE CEDAR ASSOCIATION
MINNEAPOLIS, MINN.



NO "Kick-ups" are possible



Absorbs
Vibration Here

Nelsonville Stretcher Brick
Nelsonville Filler Brick

with Nelsonville Brick



Girder rail is heavier, more expensive, and less satisfactory in wearing qualities than T-rail.

The great trouble with T-rails in street pavements has been the tendency of the blocks between the T-rails to "kick-up."

The insertion of Nelsonville Stretcher and Filler Bricks, as shown in the picture above, does away with "kick-up" dangers by absorbing all vibration.

This means that the old reliable, economical T-rail can be used in street car tracks to good advantage.

Get Our Literature Today

THE NELSONVILLE BRICK CO.

Nelsonville, Ohio



1200 years ago the Mosque of St. Sophia at Constantinople was roofed with gold—but is it today?



Drawn from the product of Copper Clad Steel Co. Pittsburgh

Steel for strength, copper for conductivity, and the following advantages over solid copper wire:

- Less weight
- Higher elastic limit
- Smaller diameter for equal work, giving less projected surface subject to wind pressure and capable of supporting sleet load.
- And for the same cost you get much more copperweld than solid copper.

No—for the same reason that you should not provide strength in electrical wires by using bigger copper wire than conductivity demands—the material costs too much.

When only *solid* copper wire was obtainable, the doubling of cross section over electrical demands for strength to withstand wind pressure, sleet loads, etc., was justifiable, *but not today.*

Aristos Copperweld wire gives the immunity of copper to corrosion, and can be selected with *only enough copper section to carry the electrical load.* The steel core gives more resistance to stretch or breaking than will *double* the amount of additional copper, and in addition to this protection, you save the difference between the cost of the steel and the surplus copper. On new lines, big further saving in poles, insulators and the labor of installing is effected where a larger diameter of Aristos Copperweld is used, and poles spaced further apart.

Ask us for the figures.

PAGE STEEL & WIRE CO.

Established 1883 as Page Woven Wire Fence Co.

Makers of "Copperweld" Copper Clad Steel Wire; Armco Welding Rods and Electrical Wire; Wire Mill Products, Plain and Galvanized; Wire of Special Analysis; Wire Fencing for all Purposes; Factory Gates; Ornamental Iron Fence; Machine Guards; Tool and Stockroom Partitions; Architectural Iron.

FACTORIES: Monessen, Pa., and Adrian, Mich.

SALES OFFICES: 30 Church Street, New York

WESTERN REPRESENTATIVES: Steel Sales Corporation, Chicago



CROWN RAIL BONDS

AS USED ON
CHICAGO SURFACE
LINES



Showing
Installation of 4/0
Solid Crown
Rail Bond
Applied Around
the Joint



Made by

American Steel & Wire Company

Chicago

New York

Cleveland

Pittsburgh

Denver

United States Steel Products Company

Pacific Coast Dept., San Francisco, Los Angeles, Seattle, Portland

Export Department, 30 Church St., New York

LINCOLN WELDER

It took the pressure of war to show America the wonderful possibilities of electric arc welding.



Welding Cast Steel army truck wheels with a Lincoln Arc Welder

It is arc welding that has repaired and made usable the German ships, once thought to be hopelessly damaged. It is arc welding that has increased by 20% the output of steel army truck wheels. Arc welding is cutting down the time on dozens of ship building operations and saving troublesome riveting. Arc welding is saving two-thirds of the time locomotives and street cars formerly spent in the repair shops.

Yet, after all, arc welding is a simple

process easily applied to any operation wherever metals are to be joined, wherever breakage, defects or wear are to be repaired.

The Lincoln Arc Welder is simply a means of producing heat at very low cost. It will do welding work more economically and efficiently than any other apparatus or process because the heat is perfectly controlled and can be directed exactly where it is needed.

Write for *Welding Bulletin No. 104-J*.

The Lincoln Electric Co. Cleveland, Ohio

New York City
Buffalo
Syracuse
Boston

Chicago
Detroit
Columbus
Pittsburgh
Minneapolis

Philadelphia
Charlotte, N. C.
Toronto, Canada
Montreal

Agencies in other Principal Cities



\$40,000 in One Instance— \$20,000 in Another



These sums represent the savings achieved in two instances by two different electric railway companies who used

Reciprocating Track Grinders

to restore a bad piece of track. In each instance it looked at first as if the only remedy for the condition was to lay new track.

But in both cases thoroughly satisfactory results were obtained without the heavy expenditure necessary for reconstruction.

The Reciprocating Grinder made this possible and produced a satisfactory solution of the problem as well as big savings.

These are just two cases from the experience of nearly a hundred companies which have bought and are using one or more Reciprocating Grinders.

The two cases cited are typical of the kind of savings made by railways throughout the country by using Reciprocating Grinders.

Not all companies utilizing Reciprocating Grinders have made as large savings from the use of these machines as the two companies mentioned above, but every single purchaser has found the machine a thoroughly good investment.

Railway Track-work Company

30th and Walnut Streets, Philadelphia

AGENTS: Holden & White, Inc., 343 S. Dearborn St., Chicago



Two men can install "ARMCO" a long length of IRON CULVERT

This is an important consideration these days when labor is scarce and high-priced. "Armco" Iron Culverts have been used for years under steam and electric railway tracks as well as under thousands of miles of high-

ways. You'll find them in all parts of the country, as good today as when they were first put into the ground. Made of "the iron that's made to last"—the *purest* and most *rust-resisting* of available culvert metal.

This Triangle Trademark

on a length of corrugated culvert means that it is made of genuine rust-resisting "ARMCO" IRON and that the culvert is *full gauge, full weight and full diameter*. To make sure of getting culverts that will last, specify "ARMCO" Iron Corrugated Culverts—and look for the Triangle Trademark.



Write to nearest manufacturer named below for full information on "Armco" Iron Culverts, Flumes, Signs, Sheets, Roofing and Formed Products.

Arkansas, Little Rock
Dixie Culvert & Metal Co.
California, Los Angeles
California Cor. Culvert Co.
California, West Berkeley
California Cor. Culvert Co.
Colorado, Denver
R. Hardesty Mfg. Co.
Delaware, Clayton
Delaware Metal Culvert Co.
Florida, Jacksonville
Dixie Culvert & Metal Co.
Georgia, Atlanta
Dixie Culvert & Metal Co.
Illinois, Springfield
Illinois Corrugated Metal Co.
Indiana, Crawfordsville
W. Q. O'Neill Co.
Iowa, Des Moines
Iowa Pure Iron Co.

Iowa, Independence
Independence Cor. Culvert Co.
Kansas, Topeka
The Road Supply & Metal Co.
Kentucky, Louisville
The Kentucky Culvert Mfg. Co.
Maryland, Baltimore
The Maryland Culvert & Metal Co.
Massachusetts, Palmer
New England Metal Culvert Co.
Michigan, Bark River
Bark River Bridge & Culvert Co.
Michigan, Lansing
Michigan Bridge & Pipe Co.
Michigan, Bay City
U. S. Bridge & Culvert Co.
Minnesota, Minneapolis
Lyle Corrugated Culvert Co.
Missouri, Moberly
Corrugated Culvert Co.

Montana, Missoula
Montana Culvert & Flume Co.
Nebraska, Wahoo
Nebraska Culvert & Mfg. Co.
New Hampshire, Nashua
Northeast Metal Culvert Co.
North Dakota, Wahpeton
Northwestern Sheet & Iron Wks.
Ohio, Middletown
American Rolling Mill Co.
The Ohio Corrugated Culvert Co.
Oregon, Portland
Coast Culvert & Flume Co.
Pennsylvania, Warren
Pennsylvania Metal Culvert Co.
South Dakota, Sioux Falls
Sioux Falls Metal Culvert Co.

Tennessee, Nashville
Tennessee Metal Culvert Co.
Texas, Dallas
Wyatt Metal and Boiler Works
Texas, El Paso
Western Metal Mfg. Co.
Texas, Houston
Lone Star Culvert Co.
Utah, Woods Cross
Utah Corrugated Culvert & Flume Co.
Virginia, Roanoke
Virginia Metal & Ig. Co., Inc.
Washington, Spokane
Spokane Culvert & Tank Co.
Wisconsin, Eau Claire
Bark River Bridge & Culvert Co.

Canada—Canada Ingot Iron Co., Ltd., Guelph, Sherbrooke, Winnipeg, Calgary.

"ARMCO" IRON RESISTS RUST



Where Rails Join

This is the point in the track that fails first. With ordinary ties, even the loosening of a fish plate will start the joint to knocking.

Here is a sure method of making the tie bind the rail ends permanently to both surface and alignment.



The Dayton Mechanical Joint Tie shown in this illustration is our answer to the "loose joint" problem. One tie block with the added security of a steel plate carries the ends of both rails. The cushion feature is here also.

It is absolutely impossible for one of the rail ends to sink even the smallest fraction of an inch below the level of the other end on the same block.

Absolutely perfect surface and alignment is the result with all the attending advantages of freedom from shocks to rolling stock, decreased noise and economy of maintenance.



THE DAYTON MECHANICAL TIE CO.

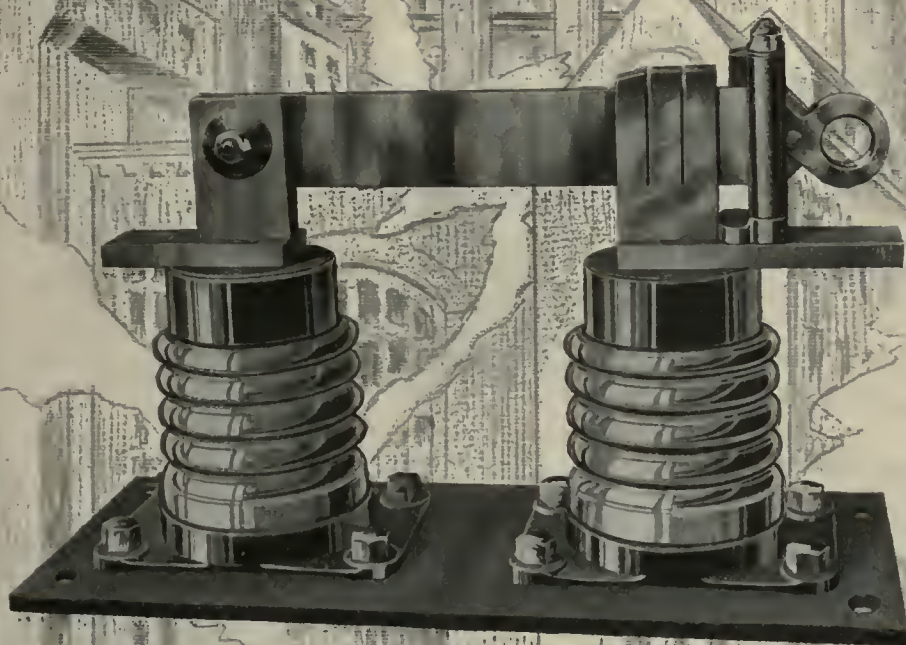
201 Third Street Arcade

DAYTON, OHIO





"FRANKLIN" Disconnecting Switch
with Positive "FRANKLIN" Lock
effectively resists electrical expulsion strains



As electrical expulsion strains increase,
the locking jaws are held closed proportionately tighter.

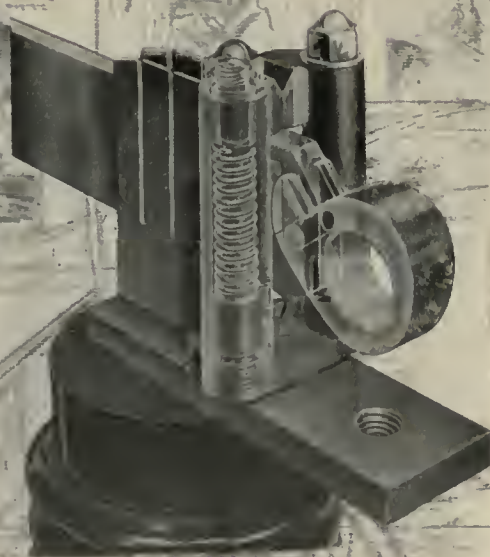
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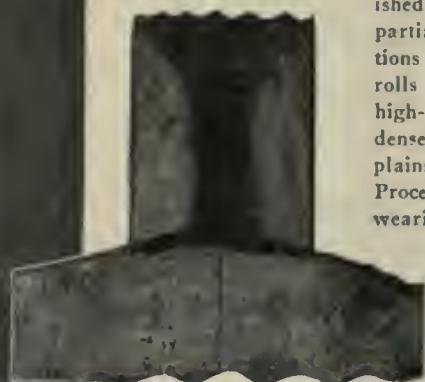
132 South Eleventh Street
Philadelphia



How the Lackawanna Deseaming Process eliminates two very serious rail faults

Greater Safety

through removal of all seamy metal from the vital part of the base



Typical base seam—the kind that tends to open up and cause fracture.

The weak, partially decarburized surface steel of the original ingot is ordinarily finished into the rail, but if hot-milled off the partially formed rail section, at the locations of rail head and base, the finishing rolls complete their work upon clean, solid high-carbon steel and produce a harder, denser and finer finish. This, in short, explains how the Lackawanna Deseaming Process eliminates seamy bases and soft wearing surface.



Better Service

through a harder top surface that is not so apt to wear down or slough off



Rail head sloughed off under the cold-rolling action of the wheels.

TREATMENT of the partially finished rail bar as described above is the only recent *real* improvement in rail manufacture—and is the logical way of meeting present-day increases in wheel load. This is proven by the marked resistance to wear and freedom from fracture, which Lackawanna Deseamed Rails have demonstrated in several years of service.

Etching away the head and base surfaces of rails made by this process shows an entire freedom from seamy, streaky metal at these locations, and hardness tests also prove that the metal here is slightly superior to that in the body of the rail.

This deseaming process, as originated and controlled exclusively by us, is now applied (see picture below) to all Lackawanna Sections of 50 pounds per yard and over.

Those seeking safer track, greater load capacity and reduced maintenance expense can profitably study our illustrated book on The Lackawanna Deseaming Process, which we will mail on request.

Ask for our booklet "Improved Track Appliances."

202

Lackawanna Steel Company

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An officer on board a warship was drilling his men.

"I want every man to lie on his back, put his legs in the air, and move them as if he were riding a bicycle," he explained. "Now commence."

After a short effort, one of the men stopped.

"Why have you stopped, Murphy?" asked the officer

"If ye plaze, sir," was the answer, "Oi'm coasting."—*Pittsburgh Chronicle-Telegraph*.

Murphy Had the Right Idea

Before the war he had evidently been a motorman operating trolley cars equipped with Arthur Power-Saving Recorders.

He believed in shutting off the power as soon as possible.

And that is the idea which your motormen will get and keep when they constantly have before their eyes an

Arthur Power-Saving Recorder



"It behooves you to Hooverize your motormen"

with its continuous record of "power on" time.

A power saving campaign utilizing the Arthur Recorder pays big dividends to the electric railway company in saving of coal—saving of brakeshoes and other car equipment—safety of operation.

The Arthur Power-Saving Recorder Company
Second National Bank Building, New Haven, Conn.



Saving Wasted Power

The constantly increasing load your power house has to carry is due more to leakage than to increased demands on it.

Proper and safe insulation stops leaks and lightens loads. Specify Irvington Insulating Products and be sure.

Irvington Black Varnished Cambric

Time Proves Its Superiority

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IRVINGTON VARNISH & INSULATOR CO.
Irvington, New Jersey.

"That's a fine record, Jim!— You're doing good work. Keep it up."

Not only does the ECONOMY-Metered motorman see what he saves, but the road's officials see what each man saves, and the road's treasury feels the benefit of it. Power devices nowadays are of vital importance.



The ECONOMY Meter

Meters the Energy and That's What You Want to Save

It measures car operating efficiency directly in terms of propulsion energy used, and thus indicates by a comparison of trip records where savings have been accomplished and where power has been wasted.

This is the only device which

enables this *direct* presentation of results. With the ECONOMY Meter the man who makes the savings is rated directly in terms of power saved and this is the logical method of rating men and stimulating competition.

The ECONOMY Meter is the only checking device which measures the actual propulsion power consumption.

It is effecting substantial savings on a number of important railways now using it.

The ECONOMY Meter is not only a "watch dog of your power," but a guardian of your equipment.

This device on your cars will speedily pay for itself in the savings it effects.

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"The Watchdog of Your Power"

Modernize Your Boiler Room

We are helping meet the labor shortage by installing coal and ash handling machinery in many existing boiler rooms.

Such equipment not only earns large returns on its cost, but makes the user independent of the unskilled labor supply, in which the draft is being most heavily felt.

Send us rough sketches of your boiler room layout, and we will tell you what can be done with it. In many cases very little alteration is required.

We design and furnish the whole equipment—machinery, bunkers, steelwork, concrete and complete erection—ready to run.

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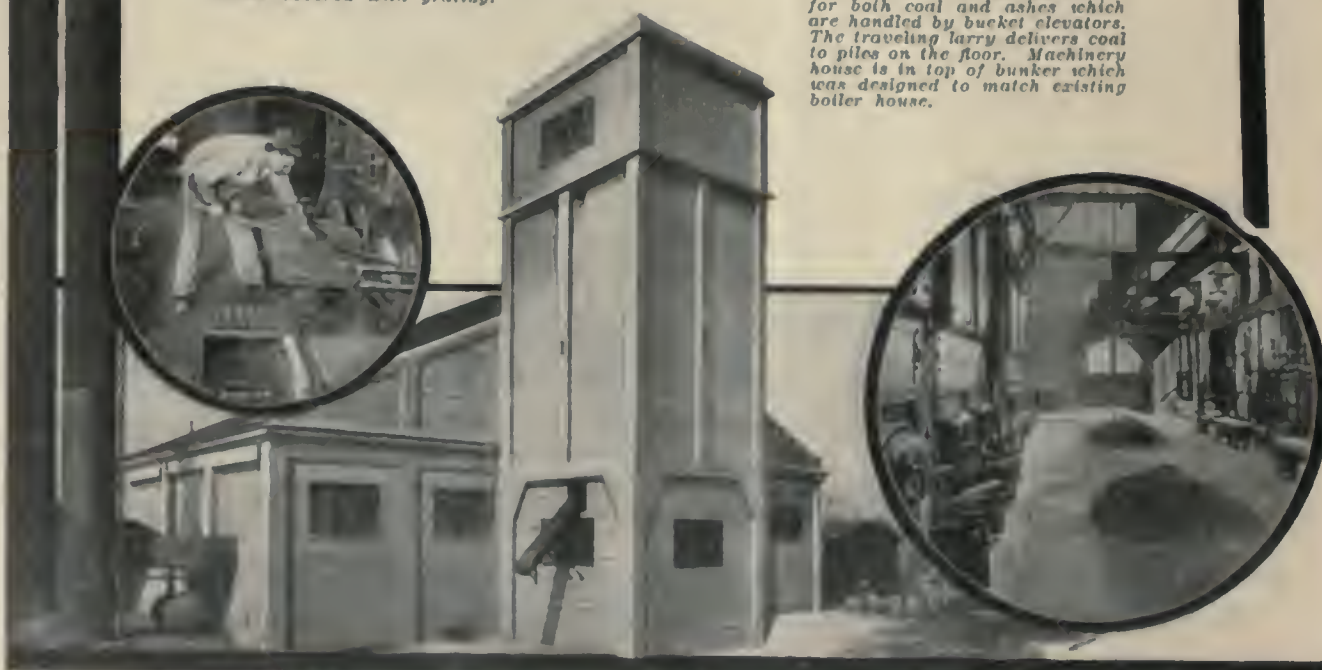
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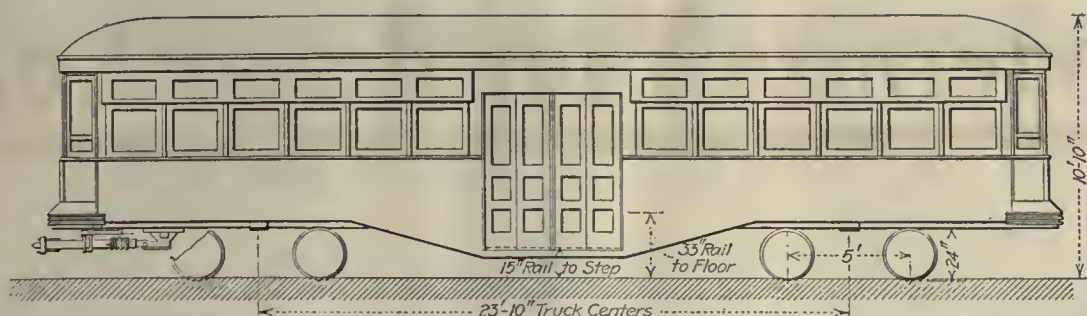
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Ashes are handled by an ash drag which runs in a trench covered with grating.

Girard Estate, Philadelphia. This bunker has compartments for both coal and ashes which are handled by bucket elevators. The traveling larry delivers coal to piles on the floor. Machinery house is in top of bunker which was designed to match existing boiler house.

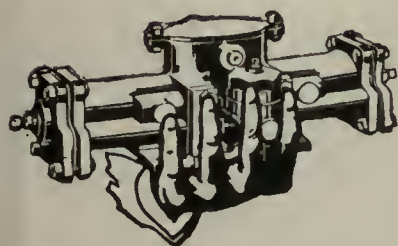




Charleston's Order For Trains and One-Man Cars

An Example of

National Pneumatic Door Engine Versatility



Extremes in surface car operation meet at Charleston, S. C.

For better service to the Navy Yard, splendid high-speed center-entrance cars are to be operated in four-car trains.

For better service on the city lines, ten One-Man Safety Cars have been ordered.

Both will have *National Pneumatic Door Engines*, facilitating in one case the safer, faster handling of crowds and in the other case conserving man-power and coal at a substantial betterment in service.

NATIONAL PNEUMATIC COMPANY
INC.

50 Church St. New York



515 Laflin St. Chicago

V. V. NO SPLICE BLOCKS

FOR EASY, QUICK WIRING



Time today is worth more than money and quick wiring devices are absolute necessities for your wiremen, to enable them to produce efficient results.

Spliced joints are not only laborious but also uncertain and where reliability is imperative the installation of

V. V. NO SPLICE BLOCKS

Solves the question of grounds, short circuits and miscellaneous troubles.

NO TORCH, NO SOLDER, NO RUBBER AND NO FRICTION TAPE is required to install drop lights, receptacles, nipple cover outlets, etc. All wires are fastened directly to the V. V. No Splice Block, making a neat, compact installation. Exceptionally easy to connect—lots of room to work, as all connections are made on the surface and not inside of the fitting. Does away with looping, and short ends of wire may be used up in wiring from outlet to outlet.



Blank and
One Hole
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2, 3 or 4
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Male or
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Nipple Cover



613—Receptacle



Any style of cover or receptacle can be mounted on the V. V. No Splice Block after connections have been made and which can be changed at any time without disconnecting or reconnecting any wires. The V. V. No Splice Block fits directly on the No. 1 size Type 5 Series V. V. Fittings, and our complete catalog and information will be mailed free upon request.



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CHICAGO

High speed road stresses—sliding wheels; these demand resiliency, strength and toughness in electric railway car wheels.

The Davis One-Wear Steel Wheel is designed and made to meet this very demand.

American Steel
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1100 McCormick Building
CHICAGO



DAVIS STEEL WHEELS



For Rough Paving or No Paving— PROVIDENCE FENDERS

For suburban, interurban or other lines with rough paving or no paving—Providence Fenders excel in the prevention of front-end accidents.

Their design, construction, lightness, strength and ease of upkeep prove their abundant superiority.

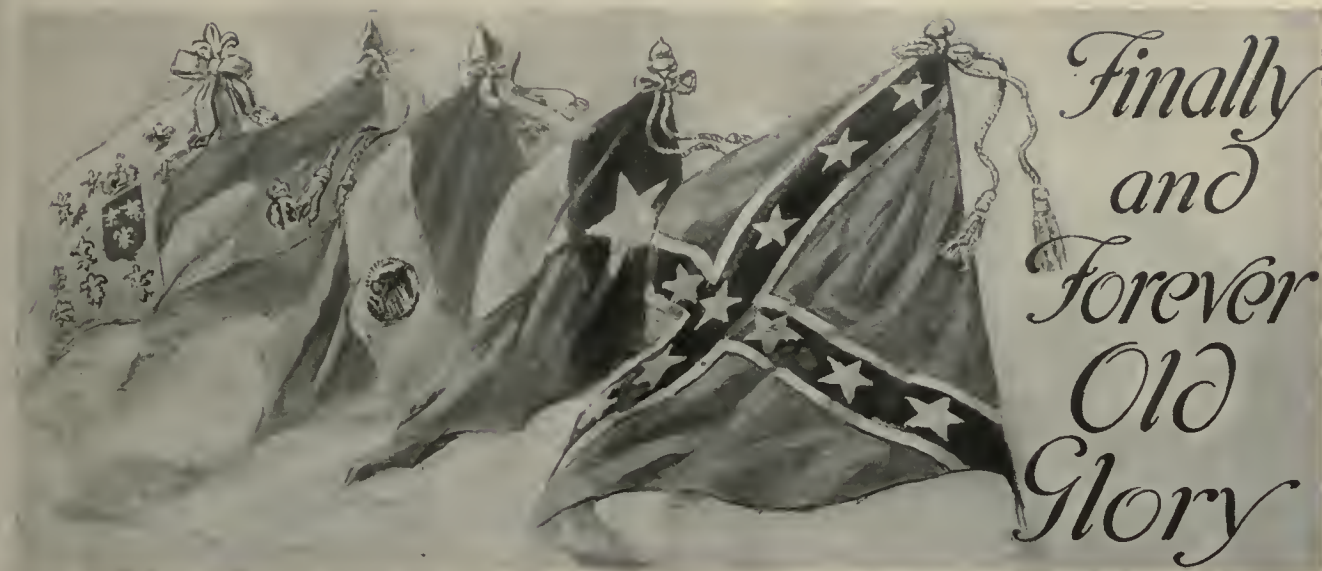
Where a projecting fender is not desirable use

H-B Life Guards

The Consolidated Car Fender Co.
Providence, R. I.

General Sales Agent

Wendell & MacDuffie Co.
61 Broadway, New York



Six Flags Waved Over Texas

between 1700 and 1865. The Fleur-de-lis of France was followed by the Royal Banner of Spain in 1725; in 1821 the Tricolor of Mexico displaced the Spanish emblem, but, in turn, it gave way to the Lone Star in 1836. From 1836 until 1845 Texas was an independent, sovereign state, owing allegiance to no one and depending upon no one.

In 1845 it joined the United States but raised the Stars and Bars of the Confederacy in 1861. Four years later the Stars and Stripes once more floated over Texas—this time for good!

Texas's climate has been the butt of innumerable jokes. One of them deals with a well-to-do Easterner who moved from New England to Arkansas, then to Texas, then to Mexico, and finally, dying there, to the regions where the Chief of the Fallen Angels rules. The story is that he never realized the nature of his last abode—the change of climate and conditions had been so *perfectly graduated*!

However, that may be, hot summers and dry climates have no terrors for the electric railway. Long interurban trips are plentiful in the Lone Star State and for this service

Galena Oils *and* Galena Service

prove their excellence and their lubricating qualities. Subjected to the most rigorous demands, they will meet every requirement, because Galena engineers study conditions *on the spot* and then prescribe the lubricant best suited to these conditions.

Galena-Signal Oil Co.
Franklin, Pa.



The Plant Behind the Product—A view of the forge and heat treating departments of the Valley Works at East St. Louis, Ill.—the home of "Electroheat" Axles.

"Electroheat" AXLES

—heat treated with "Laboratory Accuracy"

Scientific certainty attends the manufacture of "Electroheat Axles."

From the making of the steel in the open-hearth furnace to the various steps of forging and machining "Electroheat" Axles pass through skillfully trained hands—every operation is performed by men who know. But it is the vital final operation of *heat treatment* that stands out as a new achievement in axle making. Here almost *laboratory accuracy* is attained!

By "laboratory accuracy" in heat treatment is meant the wonderful precision exercised in heating these axles for annealing, quenching or tempering; for herein lies the only means of obtaining absolute *uniformity* in manufacture and the *exact* physical properties essential to maximum safety and service.

The heating of "Electroheat" Axles by electric furnace makes possible this "laboratory accuracy" in manufacture. And when Laclede engineers applied the "Electric Way" to axle manufacturing they developed a process that insures not only *better* axles—but better axles in quantity by reason of the *uniformity* which it makes possible.

Safety, Service, Satisfaction — that's what you buy in "Electroheat" Axles. Use is the test!

Note: "Electroheat" Armature shafts possess the same torsional and shock-resisting qualities as "Electroheat" Axles, being heat treated by the same process. They minimize service breakdowns and maintenance costs.



"If Heat-Treated Electrically—It's a VALSCO"

LACLEDE STEEL COMPANY

General Offices—Federal Reserve Bank Building
Saint Louis, Mo., U. S. A.

To Save Power it is necessary to coast Rico Coasting Recorders show how much coasting is being done



No matter what kind of car checking instrument you use, the only way to secure greater efficiency is to instruct the men to *Coast*.

During acceleration the motors are changing electrical energy into mechanical energy, which is stored into the moving weight or momentum of the car.

If this stored up energy is dissipated by braking, power is *lost*.

But if it is used to propel the car between the time power is thrown off and the brakes are applied, power is **SAVED**.

As the source of power saving comes from *coasting time* why not measure that time directly?

Coasting time, which the Rico Coasting Recorder gives on an *automatically-printed*, trip-by-trip record is a direct unit which is readily understood by the motorman.



Time is the Essence of Railroading

RAILWAY IMPROVEMENT CO.



61 BROADWAY, NEW YORK

A Good Motor Deserves a Good Coil

WHEN G-E Motors leave the factory they are 100% quality. To get the most from them they should be maintained in that condition. This can be done only by selecting G-E replacement supplies.

Take armature coils for an example. There are many substitutes but only one best—the one made in G-E shops by G-E men and from G-E quality material.

G-E Coils for replacement are built up from the same materials and by the same workmen as the original coils. They fit as well and last as long as those that went with the motors.

There's more to a coil than the cost.

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Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

Volume 52

New York, Saturday, August 17, 1918

Number 7

Mr. McAdoo Favors

Electrification, but Not Now

PUBLIC interest was stirred this week by some remarks on the desirability of steam railroad electrification, erroneously attributed in the daily papers to Director General McAdoo. His real position is set forth in a brief statement which he has given to the JOURNAL for publication. He very properly holds that in the present circumstances, with the tenure of government control indefinite, any extensive program for electrification cannot properly be taken into consideration. This policy is a logical one. The immediate object of this nation is to win the war, and while electrification would help, the expenditure of the same amount of money and energy in equipment which can be used by our men at the front would probably bring quicker results. But in the general scheme of conservation which must follow the war, electrification must have an important place, and here, as abroad, it is none too early for the formulation of large plans for the early future, when reconstruction will make enormous demands upon our resources. Had electrification been generally undertaken ten years ago we would be in a much better condition now from a transportation standpoint than we are. Our plans should be ready to begin the work, just as soon as our factories and men can turn from the arts of war to those of peace.

The Seatless Car

Idea Looms Up Again

IN THE ISSUE of this paper for Aug. 10 we published a plan of a so-called "seatless car" which is being tried out in service in Rome, Italy. Inquiry among transportation engineers develops the fact that the idea is not entirely novel and that it has had some serious consideration in New York City during the period just prior to the present war. Such study as was given to the idea was solely along the line of relief of congestion and rapidity of loading at terminals and transfer points. There was naturally no thought at the time of the present situation as to shortage of man power. The idea was abandoned largely because of the fear that the public and the regulating commissions would not take kindly to any suggestion which would be so directly opposed to the "seat for every fare" slogan.

The shortage in man-power has crippled the railways so much that any plan to increase the carrying capacity of city cars, especially during the rush hours, deserves consideration. A simple computation shows that the average 45-ft. cross-seat surface car will seat about forty-eight people and carry about thirty-three standees comfortably, giving a total of eighty-one passengers. However, with the car thus filled the average speed

is reduced greatly, due to delays in loading and unloading. The same car with all seats removed would carry 100 people all standing, if an average of 2½ sq.ft. of space be allowed for each person, and they would not be crowded as closely as the eighty-one people were in the car having seats. This provides for an increase in carrying capacity of more than 23 per cent, with no increase in operating charges except possibly for power.

The public has generally become used to the "standing room only" idea under very trying conditions during rush-hour travel. Practice has even shown that where the ride is not a long one, most people would rather stand in the first car at hand than wait for an available seat in the car following. All students of transportation have observed this fact.

We would not be understood as recommending the plan except in an emergency and where the run was a short one. But in these times when every plan for reducing expenses must be considered, it is well to remember what the public has accepted for tramway service in the country of one of our Allies.

Will the Use of a Cushioned Gear Reduce Friction Losses?

THE power loss in the gearing between the railway motor and the car axle which it drives has always been a source of regret to the equipment engineer, who instinctively dislikes to see good coal thus wasted. Car gearing operates under such unfortunate conditions that we have all assumed that if the teeth were properly designed to work together and to withstand the stresses, if the gears were properly lubricated, if the distances between centers were properly preserved and if grit were excluded from the gear case, we had done about all that was humanly possible under the circumstances. Even under these conditions the losses constitute too great a part of the total, especially at times of light load. Now an engineer, G. W. Remington, comes along with the suggestion, based upon extensive study and experience, that much of this friction loss is caused by vibration and that this vibration might be at least partly eliminated. The natural way out, he thinks, is to use a cushioned gear. Such gears are not novel in electric locomotive drive, but the cushion used generally for this purpose has been the coiled spring. This, Mr. Remington thinks, would not be satisfactory on electric cars. He prefers rubber, and has been assured that oil-proof rubber cushions can be had.

We hope that the publication of an article by Mr. Remington on the subject of cushioned gears, in this issue of the ELECTRIC RAILWAY JOURNAL, will lead to a trial of this scheme.

Special War Traffic Is Costly to Handle

OBSERVATION of the way electric railways are handling shipyard, munitions and camp traffic indicates that they have been obliged to muster what facilities they could and trust to luck to handle the business and to make a little money. As it has been out of the question to get new cars quickly, the veterans of past decades have been refurbished and cars have been bought or leased from railways whose traffic has declined since the war began. The result on some lines is a truly astounding conglomerate.

The best that can be done by most railways is to run motor and trailer combinations. Even these mean high platform expense in the many cases where the business is simply of twice-a-day character between the city and some distant workshop. Fare collection is another fright at many places, the cars being boarded in such a reckless way that the conductor cannot reach all the passengers.

In reality the ideal way of carrying such travel is with special locomotive-handled trains to the distributing center of the city, thereby keeping down the platform expense; and the ideal way of getting the money and relieving the conductor is through prepayment areas with motor-driven coin boxes or registers. Otherwise, we fail to see how many companies can break even, for there is not much nourishment at present costs in building track, line and substation for cars which make only two trips a day, one in the morning and the other in the evening, and run empty for one way of each of these trips.

A Useful Series of Articles on Electric Railway Rolling Stock

IN THIS ISSUE of the ELECTRIC RAILWAY JOURNAL is the conclusion of a series of seven articles on the design and construction of car bodies and trucks, written by Norman Litchfield. We hope that later he will prepare a supplementary series on maintenance in this same field. Meanwhile it will be well for all of our readers who have to do with the purchase, maintenance and operation of electric railway cars to study this series as a whole in order that they may be able to do what they have to do more intelligently.

In order effectively to handle this subject, Mr. Litchfield has been obliged to go somewhat into the subject of mechanics, which is, of course, the basis of all engineering design and construction. In some cases he has had to assume a certain amount of knowledge of mechanics on the part of the reader. The purpose of the series, however, was not to go into refinements of design which would appeal only to the car-body or truck expert, but rather to point out those principles which should be understood by general managers, equipment superintendents and employees generally who hope eventually to attain to positions of greater responsibility than those that they now occupy.

There is a certain tendency among many to "shy" at mathematics or mathematical-looking diagrams, in the prevalent but mistaken fear that these can only be understood by the initiated. Mathematics, however, is the basis of all safe and sane business, and it is only when it takes algebraic form that it appears

formidable. In this series Mr. Litchfield has avoided the use of all mathematical "frills" and has used only that theory which is essential to his line of thought. He has, we believe, made a notable contribution to the literature of his subject.

Now that the series is complete we urge again a review of the seven articles as a whole, and it will be a mighty dull reader who will not find a little effort put upon such a review of very great value in his work.

How the War Has Affected Railway Traffic

THE effect of the war on increasing the operating expenses of electric railways and thus necessitating a higher fare are pretty well understood now by the public, but a great many people do not yet realize that many of the railways are not carrying anywhere near so many passengers as formerly. We say many of the railways because on some lines, especially those near cantonments, shipbuilding plants and munition work, the traffic has increased. This makes difficult any general summary of the situation, either as to cause or effect. Where the fare has been increased, it is a popular theory to attribute the diminution of traffic entirely to that cause. But we believe that much of it in many cases would have occurred in any event.

One reason, of course, is that a considerable proportion of the men between the ages of twenty-one and thirty-one have left to enter military service. These men in their home town are usually liberal spenders, at least for local transportation. As a rule, they are earning good wages and like to ride to and from their work as well as use the cars for trips in the evening and on holidays. The subtraction of say 5 per cent of the population of a town is bound to have an effect on electric railway travel, but when this percentage represents the most active part of the population, the effect is bound to be larger.

Another important cause of reduced traction earnings, in the opinion of many railway men, is the conservation and savings campaigns being followed in all parts of the country, especially that of the purchase of Thrift Stamps. No railway man would discourage this campaign, but it undoubtedly has had an important effect on electric railway earnings. The principle preached is the saving in different ways of small amounts for the purchase of Thrift Stamps, and the easiest way that many can save five nickels is by walking five times instead of riding on the street cars. The campaign in the public schools for Thrift Stamps has undoubtedly been the means of diverting many nickels from the railway company to the government.

The third cause for reduced traffic is that partly through shortage of labor and partly in their efforts to economize, many companies have reduced their service. Headways have been lengthened from three minutes to five minutes or from five minutes to seven and one-half minutes, etc., and this has naturally resulted in a further loss of patronage.

Where there has been an increase in fare, there has also undoubtedly been some effect on traffic, but for the reasons outlined we do not believe that all of the decrease in traffic can be attributed to an increase of fare

Depreciation Must Be Recognized, But the Public Must Pay for It

ADEQUATE allowance should be provided for electric railway depreciation. Adequate provision should also be made for the electric railway earning power necessary for sound credit. These are not new doctrines, but we direct attention to one phase of them which is apparently not soundly considered—that is, their relative importance.

What should be done when revenues lag behind costs so that full provision cannot be made for both depreciation and a fair rate of return to investors? There is no reason for entering upon an academic discussion of what is the priority between these two items, and whether the public prefers an insolvent railway in first-class physical condition or a prosperous company with more or less deteriorated property. The vital point is simply this—in the case of revenue deficiency, should it be assumed that it makes no difference how much the security holders, or in practice the stockholders, suffer if only the commissions' ideas on depreciation are enforced?

This point is not theoretical. It has a practical bearing in New York State at this very moment. The situation there is briefly this. In 1912 the First District Commission promulgated an order requiring a monthly allowance of 20 per cent of the operating revenues for maintenance and depreciation. After a long legal battle the highest State court has now held that the regulatory law does not grant to the commission the authority to make such an order. The same court, it will be recalled, has also ruled that the public service law has conferred upon the commissions no power to raise franchise rates, regardless of the cost of operation.

In the face of this situation, the Second District Commission, which has under way a revision of its accounting rules, as previously noted in these pages, is "suggesting" to companies that between 2 and 5 per cent a year on the cost of way and structures and between 2 and 10 per cent for equipment will generally be less open to question than depreciation rates outside of these limits. Each company may determine its own depreciation charges, of course, but the commission will follow the above stated policy in passing upon the adequacy or inadequacy of such charges in rate and other cases.

The Second District Commission is undoubtedly actuated by the most sincere motives, and we know that it feels as much concerned about the credit of the companies within its jurisdiction as it does about depreciation. But the duty of both commissions in New York, to the railways and to the public, demands that the situation be handled in a larger way. Both depreciation allowances and a proper return to investors are absolute necessities, but they require adequate fares—these are fundamental.

What is needed, therefore, is a redrafting of the regulatory law. If the commissions are to establish depreciation rates, they should have power at the same time to increase rates. Commission regulation of depreciation accounting, combined with the present hit-and-miss system of commission and municipal rate-making, would be most inequitable. Justice lies only in *simultaneous* amendments covering both depreciation and fares.

Even then, the commissions should realize that the

proper allowance to be included in present-day operating expenses for insuring the future replacement of physical property is one still largely of conjecture and opinion. Hence there should be some range for the exercise of judgment on the part of those charged with the responsibility of conserving the physical and financial integrity of the properties. In the past the companies probably advocated lower rates than the commissions approved, but the conditions might easily be reversed. For instance, with falling prices of labor and supplies the companies might argue for a high depreciation charge so as to keep the fares up, while a commission might urge a lower charge to permit a reduction in fare.

Can Further Economies in Car Heating Be Introduced?

THE utilization in winter for car heating of the heat dissipated in grid resistors and motors has been considered many times by various railroads. The amount of heat that could be thus obtained has been found to vary widely with the character of service, the manner in which the motorman handles his car, the speed, the windage and other variables, which make the utilization of this heat a discouraging proposition. In another part of this issue is an article giving some results of tests made to determine, if possible, just how much of this waste heat could be utilized without excessive cost for car changes. Some results and suggestions are also given for smoothing out the peak loads during rush hours by interlocking the regulation of the car heaters with the control equipment, so that current can be used for heating the car only during the periods of coasting, braking and stops. The value of this smoothing method will increase as the number of cars in operation is decreased and should be of greatest value to small systems. This heating peak amounts to as much as 30 per cent in some cases, and as the top of the peak costs most, this represents more than that percentage in actual cost in and the amount of fuel used. From the data which we have been able to collect, it is evident that a full equipment of car heaters is necessary to provide for extreme conditions and that a full utilization of any other sources of heat can be obtained only by the use of thermostatic control for regulating the heat supplied by the electric heating equipment.

No doubt many tests and trials similar to those given have been made by other roads of which we have no knowledge. It is the hope of the editors that this article will open up a discussion which will supply data leading to some definite results and aid in producing the much needed economy in this direction, for economy in the use of the coal supply which will be available next winter is not only desirable but necessary. Any plan that gives promise of a saving in this direction is worthy of consideration and trial. During the past winter the regulations affecting car heating were suspended by the Massachusetts Public Service Commission in order to save coal, and the heating of cars was made optional with each operating company. The traveling public accepted the conditions without serious complaint, but all operating officials recognize the desirability of providing heat for cars if this is at all possible.

Way Department Requires Particularly Complete Organization

The Work of the Department Requires Closest Co-operation with Other Departments, Specific Subdivision of Duties and Responsibilities, and Strict Discipline

By R. C. Cram

Assistant Engineer, Department of Way and Structures, Brooklyn Rapid Transit System

THE recent articles by the writer have mainly been devoted to a discussion of some particular features of maintenance of way activities. Little or nothing has been said concerning the organization of way department and it may not be out of place to consider the subject at this time, since it is only by means of thorough organization that the work of the department can be satisfactorily accomplished.

A discussion of the general organization of an electric railway system would be out of order here, but it may be well to state that the way department is often in charge of an engineer or superintendent who is directly responsible to the executive officer of the company in general charge of operations, usually a general manager. The way department has been defined* as "that division of the company organization having charge of the right-of-way, tracks, bridges and all matters pertaining to their construction and maintenance, with such other duties as may be assigned to it."

Way departments employ a great many men, especially during the summer season when extraordinary work of all kinds is under way. The larger roads will employ from 200 to 500 men the year round, with increases up to 1500 or more in summer. The number of men per mile of track steadily employed is usually somewhat greater than is found in steam-road work, due largely to the necessity for opening and closing pavements where the lines are located in larger communities. There are a number of special lines of work, which require a class of men having ability considerably above that required of the common laborer, such as bonders, drill operators, pavers, grinder men, welder men, hard-center men, and electric-switch maintainers. The efficient direction of so many classes of labor in several almost distinct lines of work requires the placing of dependence upon organization and discipline in order to harmonize their endeavors into the finished product, which is the track.

What Constitutes a Good Organization?

Organization has been defined as the systematic union of individuals in a body whose officers, agents and members work together for a common end. It requires little argument to prove that any undertaking which involves the services of a number of people, can secure satisfactory results in economical management only through

co-ordinated direction by one head. Neither our industries nor the various activities of government could have reached the comparatively high state of efficiency now enjoyed, but for the beneficial effects of organization.

In planning an organization, the main object must be kept well in mind, and the following general principles will be found essential to the successful organization†:

1. At all points where action must be taken or decision made, authority should be centralized in one person.

Division of authority encourages evasion of responsibility.

2. The authority and responsibility of each position must be definitely outlined. Uncertain boundaries of authority lead to conflict and ill-feeling.

3. The duties of each position must be made to conform to the capabilities of the incumbent.

This may often best be done by supplanting the incumbent.

4. One person should not be made subordinate to two or more others, especially in regard to matters closely related.

5. The disciplinary authority should be placed in the same hands as the responsibility.

6. The work of administration should be distributed in such a way as to avoid unequal loading of officers.

7. There should be no positions which do not permit of promotion therefrom. Otherwise there is no incentive for incumbents to put forth their best efforts.

In reference to the foregoing, Willard‡ says: "In following these principles two things must constantly be kept in mind, namely, (1) that the individual is the most important unit in any organization, and (2) that nothing makes a man so conservative as responsibility. The former is lost sight of in many cases, but always to the detriment of the organization." Having planned the organization and filled the positions, the work is only started. The individual must be instructed, developed and trained to harmonize his work with that of his fellows. A co-operative spirit must be kindled and fanned to the flame of enthusiasm if the organization is to be successful.

It may be well to again quote Willard on a point which often comes up in electric railway service. He says: "One of the most difficult tasks in outlining any organization is to correlate the activities of the outside workers with the necessary correspondence, records and accounting on the inside. The man out on the job al-



The track department, as well as the band, needs an inspiring leader

*Report Committee on Way Matters, American Electric Railway Engineering Association, 1911.

†See "Economics of Railway Operation," by M. L. Byers.
‡Willard: "Maintenance of Way and Structures."

ways has his troubles with the man in the office, but much of the friction will be avoided if the man in the office has a first-hand knowledge of the work outside." This means that an office man in charge of records, for instance, is better able to get correct information promptly if he knows what he is after and how the work which he is trying to record is done. It also recalls the famous verses on the reports of one Finigan, the trackman, who was so often called upon to boil down his reports of derailments that his final report simply read "Off agin, on agin, gone agin, Finigan."

The way department is only one of several departmental agencies by means of which the operation of the road is carried on. In course of its activities the department comes in contact with these other departments in many ways and it must co-operate with them to the

fullest extent. The other departments chiefly concerned are as follows: (1) Operating, (2) electrical, (3) mechanical, (4) legal, (5) accounting and (6) purchasing.

Matters requiring co-operation with the several departments above enumerated may be classified in the same general order.

1. *Operating.* The operating department must be consulted on such matters as car schedules during reconstruction work; temporary diversions of traffic; location of crossovers; design of special-work layouts to give proper facilities; carhouse layouts; station facilities on interurban lines; special terminal track facilities; installation of electric track switches; removal of snow and ice and cleaning, sanding and greasing track.

2. *Electrical.* The electrical department must be kept in touch with matters of joint bonding; cross-bonding;

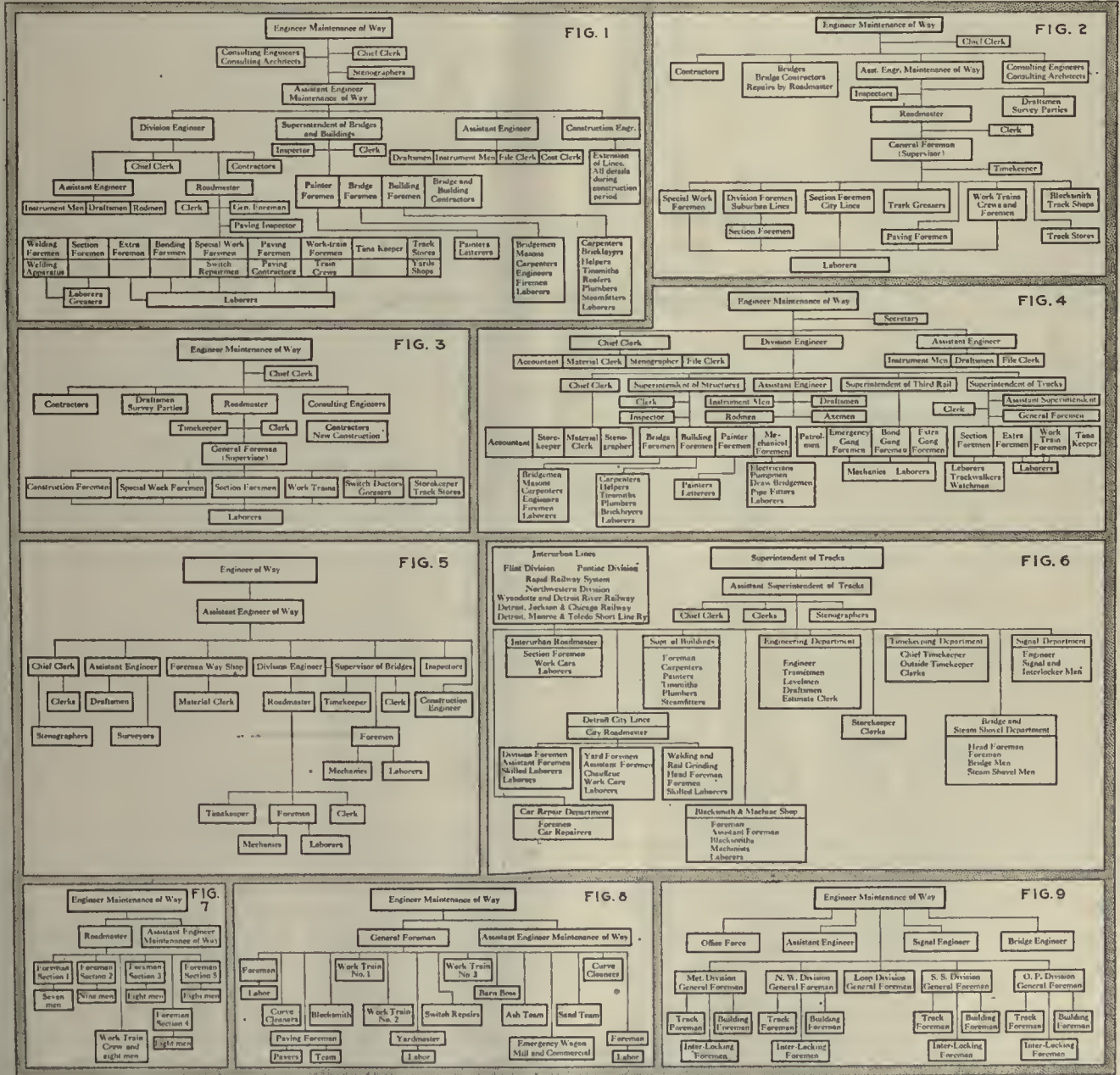


Fig. 1—For large property. Fig. 2—For property of moderate size. Fig. 3—Suggested for small property. Fig. 4—Alternative suggested form. Fig. 5—Chart recommended by committee on way matters of the American Electric Railway Engineering Association. Fig. 6—For Detroit United Lines, prepared in 1912. Fig. 7—For New York State Railways, Rochester Lines (interurban), 1911. Fig. 8—For New York State Railways, Rochester Lines (city), 1911. Fig. 9—For Elevated Railroads of Chicago, 1915.

Organization Charts for the Maintenance of Way Departments

minimum clearance under trolley wire at close points under bridges; location of wire in track diversions; location of track facilities for handling coal and ashes at power stations.

3. *Mechanical.* The advice of the mechanical department is needed in matters having to do with car clearance; special departmental work cars; transfer tables in shops; grades and vertical curves; minimum curves in special work; repair of special, heavy track tools; upkeep of track which may be causing equipment damage.

4. *Legal.* The legal department must furnish advice in regard to accidents due to alleged track or pavement defects; franchise plans and petitions for additional track facilities; discussions with civic authorities in paving projects; supposed violations of ordinances or regulations affecting tracks.

5. *Accounting.* The auditor's department and the way department must be in touch with respect to pay-rolls; distribution of charges to proper accounts; furnishing of authorization numbers for all special expense appropriations; payments to contractors; records of expenditure; inter-departmental bills; bills against other concerns for work done, and all additions to or deductions from capital due to changes in structures.

6. *Purchasing.* The purchasing agent must be consulted in matters affecting purchase of supplies; standard stocks of materials; storage and withdrawal of materials; inspection of material; pricing of material and supplies for estimates.

It is obvious that the number and extent of the departmental organizations must depend upon the size and character of the property. On small properties the duties of several department heads are assumed by comparatively few men, while the larger properties will often have at least the six departments above noted and sometimes more. These departments will often be made up of several subdivisions, each handling a branch of the work.

Organization Charts Help to Co-ordinate Duties and Personnel

It is the practice on most electric railways to have a diagram or chart of the organization of the way department for the purpose of clearly defining the duties and authority of the individuals in charge of the varied phases of the work. While it is true that there is no scheme of organization which will suit more than a few properties, there are features which are much in common and in the main such organizations are only variations of the general organization schemes shown in the accompanying charts.

It should be remembered that the organization diagram or chart will be largely controlled by the size and scope of the work undertaken by or in charge of the department.

In respect to these charts it may be of interest to note that Figs. 1 to 4 were charts prepared for discussion by the way committee of the American Electric Railway Engineering Association in 1911, while Fig. 5 is the final chart which was presented by that committee in its report on organization and rules for the way department.

Fig. 6 shows the scheme in effect in Detroit in 1912, while Figs. 7 and 8 present the organization in Rochester

in 1911. Fig. 9 is presented to give an idea of the organization used in the way department of the Elevated Railroads of Chicago.

In carrying out the work of the way department, there are many rules and regulations governing the performance of work and duties of individuals, but in general these rules are not in book form and have been put in effect in the shape of letter instructions or bulletins. Many rules and regulations are in force simply as unwritten law, so to speak. There is no doubt but that much good would result if the way departments paid more attention to this subject along the lines suggested by the 1911 way committee in its report, which contains an admirable set of rules and regulations for the government of the way department.

Results Are Dependent Upon Discipline in the Organization

Discipline has been defined to include instruction and government. Instructions to way department employees are usually given in the form of oral instructions from roadmasters and foremen. These in turn must get their instructions from the head of the department in the form of oral instructions, printed rules and specific plans.

Government consists in directing and securing obedience to the rules and instructions. The best of rules and instructions will not secure good workmanship; this must be had by proper supervision, which calls for frequent and careful inspection with a judicious use of incentives and penalties. Willard may well be quoted here on this point as follows: "Discipline is administered in maintenance departments by a reprimand, suspension or both.

A record of the services of each man, even down to the track laborer, should be made when he enters the service and record kept afterward of his services to the company. For minor offences a personal reprimand, given with the understanding that it will be entered in the man's record, will produce the best results with most men. The severity of any sentence, as well as promotions, should largely be based on a man's previous record. That organization which recognizes its old and faithful employees in the way of promotion when vacancies occur, will always have more loyal and efficient employees."

Combustion Engineers Wanted by Fuel Administration

The Bureau of Oil Conservation, Oil Division, U. S. Fuel Administration desires to secure a combustion engineer for each of the districts named below, who will act as inspector of all plants within the district using fuel oil and natural gas: Boston, Providence, New York City, Philadelphia, Pittsburgh, Buffalo, Detroit, Chicago, Minneapolis, Tulsa, New Orleans and San Francisco. It is desired that these men shall act as volunteers. The administration will pay a reasonable compensation for men who cannot give their services for nothing. Only those who have had experience in the combustion of fuel oil and natural gas would be of value to the administration. Application can be made to W. Champlain Robinson, Director of Oil Conservation, Oil Division, United States Fuel Administration, Washington, D. C.

Increased Economy Results from Correct Operation of Car Equipment

By C. W. Squier
Electrical Engineer

The Effects of Various Rates of Acceleration and Braking on the Schedule Speeds and Power Consumed in Car Operation Are Discussed, Together with the Relation of the Length and Number of Stops to the Cost of Operation

IT IS THE DUTY of a good motor designer to determine all the factors of possible waste in the equipment he is designing and endeavor to eliminate or reduce them. The operation of the motors involves some losses that cannot be avoided, but all can be kept at a minimum by correct operation, and much energy can be saved by careful and efficient operators.

The energy wasted in car operation includes the losses in the grid resistors, the iron and copper losses in the motors during acceleration and the energy absorbed in braking which is dissipated as heat in the brakeshoes and wheels. The useful energy is that which is used in overcoming train resistance, including the resistance due to grades and curves. In considering the means available for reducing the power necessary in operating a car over a definite run at a certain schedule speed, the effect of varying the different cycles of operation will be shown. The accelerating cycle which forms the first part of every run ex-

creasing the car speed at as nearly a uniform rate as possible in the shortest time consistent with current peaks, wheel slippage and comfort of the passengers. Such a consideration is quite independent of the manner of manipulation of the apparatus.

The only way in which a designer can control manipulation is by making the apparatus automatic in its functioning. The accelerating force is a certain constant amount to which impulses are added as the various steps of the starting resistors are cut out. For any given average rate of acceleration the same amount of energy is wasted in the car resistors every time the car is started and the controller is brought to the full parallel position. This is entirely independent of the length of the run, the number of stops per mile, the rate of

braking, or the length of stop. As the length of the run increases this constant rheostatic loss becomes a smaller percentage of the total power used. It is thus on short runs that the economy of rapid acceleration is most apparent. As a study of the effect of different rates of acceleration

on the energy input for a car operating under average conditions I have plotted the several graphs shown in Fig. 1, for rates of acceleration of $\frac{3}{4}$, 1, $1\frac{1}{4}$, $1\frac{1}{2}$, $1\frac{3}{4}$ and 2 m.p.h.p.s. The operating conditions assumed are the same as those already given in this series of articles, and are for a 23.56-ton car making a run of 620 ft. at a schedule speed of $8\frac{1}{2}$ m.p.h. with a



Even the small boy knows that coasting saves energy

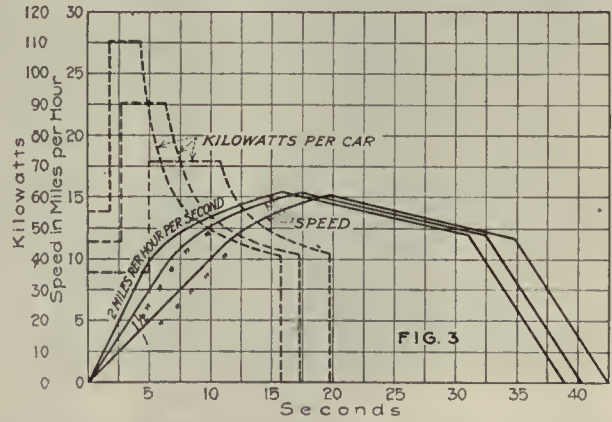
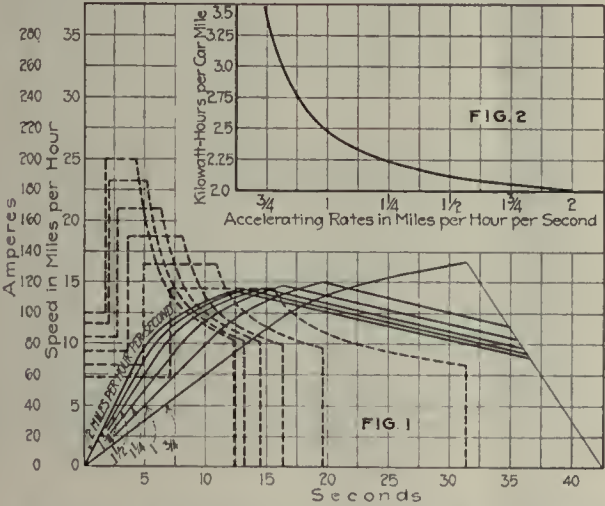


FIG. 1—INFLUENCE OF VARIOUS RATES OF ACCELERATION ON THE POWER INPUT OF A CAR. FIG. 2—RELATION BETWEEN POWER INPUT PER CAR-MILE AND ACCELERATING RATES IN MILES PER HOUR PER SECOND. FIG. 3—EFFECT OF VARIOUS RATES OF ACCELERATION ON THE SCHEDULE SPEED MADE BY A CAR

tends from the starting of the car through the period in which it is brought into motion. The ultimate speed of a car depends on the duration of this accelerating period and the grades or curves encountered. The efficiency obtained during the accelerating period depends on the waste in energy and time that takes place. The aim of control designers is to provide for in-

7.2 second stop, the rate of braking being taken at $1\frac{1}{2}$ m.p.h.p.s. The results are given in Table I. The difference in energy saving is considerably less between the higher rates of acceleration than it is between the lower rates. For example, the saving through accelerating at 1 m.p.h.p.s. instead of $\frac{3}{4}$ m.p.h.p.s. is 27.8 per cent, while the saving through accelera-

tion at 2 m.p.h.p.s. as against 1½ m.p.h.p.s. is only 0.1 per cent.

To illustrate this decreased variation the graph shown in Fig. 2 has been constructed, with varying rates of acceleration plotted against the energy per car-mile required. It will be noted that there is a "knee" in the graph between the 1 and 1½ m.p.h.p.s. points, and for

tained by increasing the schedule speeds as the rate of acceleration is increased. This, of course, takes more power, so the saving results from operating fewer cars to perform the same service, and is shown by the decreased cost of platform expense as well as by a small total saving in power.

To show the economies that may be expected in this direction I have plotted the graphs shown in Fig. 3 for the same equipment used for the previous graphs. The rates of acceleration taken are 1, 1½ and 2 m.p.h.p.s. and the basis for determining the point at which power is cut off is arrived at by making the number of seconds consumed in coasting equal to the speed in miles per hour at the point of cut-off. Thus, when accelerating at a rate of 1 m.p.h.p.s. the point of cut-off is 15.1 m.p.h. and the car is allowed to coast for 15.1 seconds before the brakes are applied. This method of making the amount of coasting in seconds equal to a constant times the speed in miles per hour at cut-off is very convenient for comparing runs of different lengths at different schedule speeds, and the results obtained for a continuous run with various stops by using this method will approximate very closely to the service obtained from a typical run.

To make certain that the continuous current rating of the motors is not exceeded, a typical run should be laid out and the speed-time and power-input graphs plotted. The ratio of the amount of coasting in seconds to the speed at cut-off in miles per hour for this typical run will be the constant desired.

Operating Cost Decreases as Acceleration Rate Increases

In Table II the resulting operating cost for three different rates of acceleration are shown for comparison. To illustrate the annual saving it may be assumed that each car will operate 40,000 miles during the year, that the average platform expense will be 60 cents per car-hour plus 10 per cent, and that the cost of energy at the car will be 1½ cents per kilowatt-hour. A total

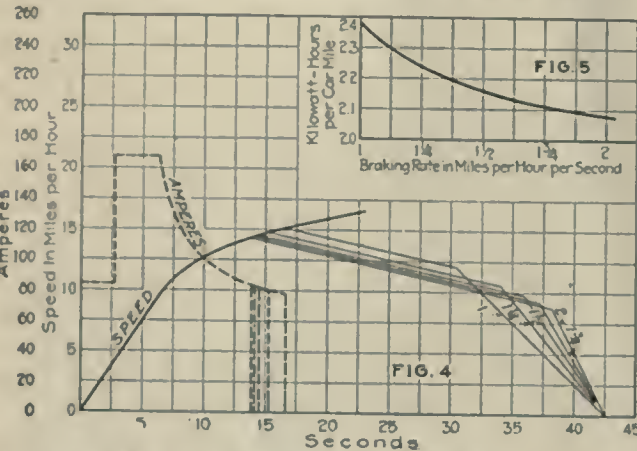


FIG. 4—COMPARISON OF POWER INPUT FOR A CAR OPERATED WITH VARIOUS RATES OF BRAKING. FIG. 5—RELATION BETWEEN POWER INPUT PER CAR-MILE AND THE BRAKING RATE IN MILES PER HOUR PER SECOND

rates higher than this the difference in energy saving is comparatively small.

In this particular case it appears that the economic limit of acceleration is reached at about 1½ m.p.h.p.s., and the small additional economy that results from a higher rate of acceleration would more than likely be offset by the increased cost of maintaining the equipment and the resulting decreased comfort of passengers.

Referring to the graphs in Fig. 1 we find that when accelerating at the low rate of ¾ m.p.h.p.s. it is necessary to operate the car without coasting in order to make the schedule speed of 8½ m.p.h. This, of course,

TABLE I—COMPARISON OF ENERGY TAKEN WITH DIFFERENT RATES OF ACCELERATION

Acceleration Rate M.P.H.P.S.	Speed at Which Last Resistance Step is Cut Out, M.P.H.	Reboosteric Accelerating Period, Seconds	Kilowatt-Hours				Per Cent Power Saving Over Rate of 1 M.P.H.P.S.
			Total Accelerating Period, Seconds	For Reboosteric Accelerating Period	For Total Accelerating Period	Per Car-Mile	
1	11.63	15.3	13.3	0.210	0.4012	3.42	
1½	10.79	10.8	19.7	0.167	0.2896	2.47	27.8
2	10.03	8.0	16.3	0.139	0.2648	2.23	34.8
	9.49	6.3	14.5	0.124	0.2302	2.12	38.0
	9.02	5.1	13.2	0.116	0.2400	2.04	40.3
2	8.55	4.8	12.3	0.101	0.2377	2.02	40.9

could not be done in regular service, so that the average rate of acceleration must be higher than ¾ m.p.h.p.s. if the desired schedule is maintained.

Further Economies Result from Increasing Schedule Speeds with Rate of Acceleration

In making these comparisons of energy taken for various rates of acceleration, the point should not be lost sight of that we are considering that the cars and equipment have a definite service to perform. Other advantages of a higher rate of acceleration can be ob-

TABLE II—EFFECT OF THREE RATES OF ACCELERATION ON SCHEDULE SPEED AND OPERATING COSTS

Acceleration Rate M.P.H.P.S.	Schedule Speed, M.P.H.	Energy Kilowatt- Hours per Car- Mile	Car-Hours for 40,000 Car-Mile Operation	Platform Wages at 60 Cents per Car- Hour Plus 10 per Cent	Power Cost at 1½ Cents per Kilo- watt-hour	Total Cost	Per Cent Saving
1	8.5	2.47	4,706	\$3,105.96	\$1,482.00	\$4,587.96	
1½	9.2	2.23	4,494	2,966.04	1,464.00	4,430.04	3.5
2	9.9	2.02	4,348	2,869.68	1,434.00	4,303.68	6.2

saving of \$157.92 per car per year is obtained by increasing the rate of acceleration from 1 to 1½ m.p.h.p.s. and the schedule speed from 8.5 m.p.h. to 9.2 m.p.h. The total saving per car per year obtained by an increase in acceleration from 1 to 2 m.p.h.p.s. and increasing the schedule speed of from 8.5 to 9.2 m.p.h. is \$284.28, or 6.2 per cent. If we consider a single line 8 miles long operating a service at five-minute intervals, this would take twenty-four cars at a schedule speed of 8.5 m.p.h. and twenty-two cars at 9.2 m.p.h., or a saving of two cars for the line. We thus see the

advantages which are to be gained by keeping the accelerating rate up to the maximum consistent with the equipment operated.

A High Braking Rate Reduces the Power Input

To illustrate how the energy input varies with different braking rates, the graphs shown in Fig. 4 have been plotted. These are made on the basis of accelerating at $1\frac{1}{2}$ m.p.h.p.s. and results are shown for rates of retardation of 1, $1\frac{1}{4}$, $1\frac{1}{2}$, $1\frac{3}{4}$ and 2 m.p.h.p.s. The saving in energy is obtained by cutting off power sooner and coasting to a lower speed before applying the brakes to produce a higher rate of retardation.

Fig. 5 is a graph for the various braking rates plotted against the energy required to make the run. As in the accelerating graph, Fig. 2, we see that there is a "knee" in this curve beyond which the energy saving is comparatively small. The "knee" in the retardation graph, however, is less pronounced than that in the accelerating graph. In actual service for surface lines it has been found that the most economical braking rate lies between $1\frac{1}{2}$ and $2\frac{1}{4}$ m.p.h.p.s., depending on the characteristics of the equipment and the service operated. Beyond this it is better to consider careful handling of the equipment and the comfort of passengers in preference to the slight additional economies that result.

With Shorter Stops Smaller Motors Can Be Used

The number and length of stops are two factors of prime importance in car operation. They determine, in a measure, not only the size of the motors but also the energy consumed, the schedule speeds obtained, the

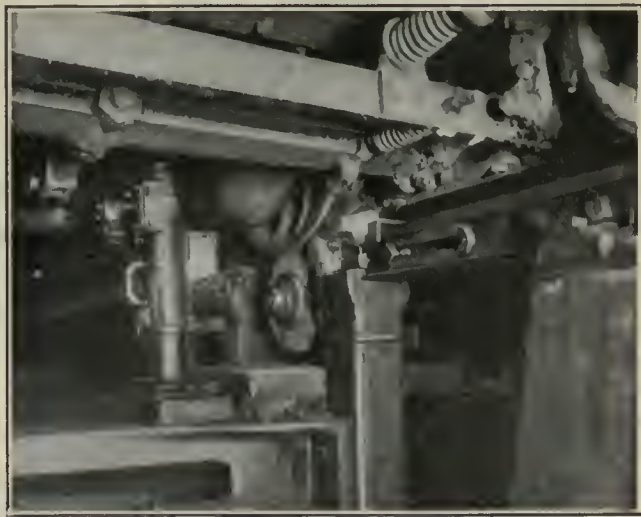
doors, steps and platforms, and by the efficiency of the operating crew. A very little confusion will lengthen a stop from two to three seconds. In the service that we are considering, with eight and one-half stops per mile and a run 8 miles long, 6.8 minutes would be lost in a round trip by increasing the average length of each stop three seconds. This would necessitate using an additional car on the line, and when the cost of the power used for operating this car, together with the additional cost of the platform wages is figured, a good idea of the effect of a few seconds at each stop can be obtained.

Operating a Pit Grinder Without Rheostatic Losses

TO TRUE flatted car wheels with a pit wheel grinder it is desirable to reduce the speed of the car wheels much below that obtained with 500 to 600 volts applied to the car motors. As the use of grid or water rheostats for reducing the voltage at the motor terminals involves large losses, Homer MacNutt, superintendent of motive power San Diego Electric Railway, used 110 volts obtained as follows:

To the pit grinder motor he has connected a counter-shaft which drives a 110-volt generator. This in turn supplies the current for running the railway motors at the lower speed with a very small loss of power. Another advantage of this plan is the greater safety provided for the operator inasmuch as the 600-volt trolley circuit is entirely disconnected from the grinder. A field rheostat gives a range of 80 to 110 volts.

This pit grinder is of the usual Q. M. S. type equipped with Norton crystalline wheels No. 20, 14 in. in diameter



AT LEFT, PIT GRINDER WITH SCOTCHING PLATES FOR ASSISTING IN LOCATING WHEELS PROPERLY; AT RIGHT, CAR IN POSITION FOR GRINDING WHEELS

number of cars necessary for a given service, and the capacity of the line and power house. This is one of the largest fields for operating economies that can be found in electric railway operation to-day. In my article in the *ELECTRIC RAILWAY JOURNAL* of April 20, I showed how the number of stops affects the schedule speeds and really forms an operating characteristic for the selection of the motors. The duration of stop is determined largely by car design, by the size and type of

by 2 in. face. About thirty minutes is required to grind the average wheel. This rapidity is due in part to the use of scotching pieces or stops on the rails whereby the operator of the car can center the car wheels quickly without help. The stops are simply metal shoes with enough of a central depression to make itself felt to the shopman who is running the car. Because of the time saved in jockeying for position one man can make all preparations necessary for grinding in five minutes.

Applying Common-Sense in Line Construction

Money and Time Can Be Saved by Close Co-operation of Designer and Constructor and by Attention to Details Commonly Overlooked

By *Charles R. Harte*

Construction Engineer,
The Connecticut Company, New Haven, Conn.

THE locations and heights of the supports for a line are usually first laid out in the office, from the location plans and profile. This preliminary determination should then be tested in the field to insure that due regard has been given to the actual conditions. If the plotted information has been complete, the paper location will require little changing, but it frequently happens that the preliminary survey was rushed and that important factors have been overlooked.

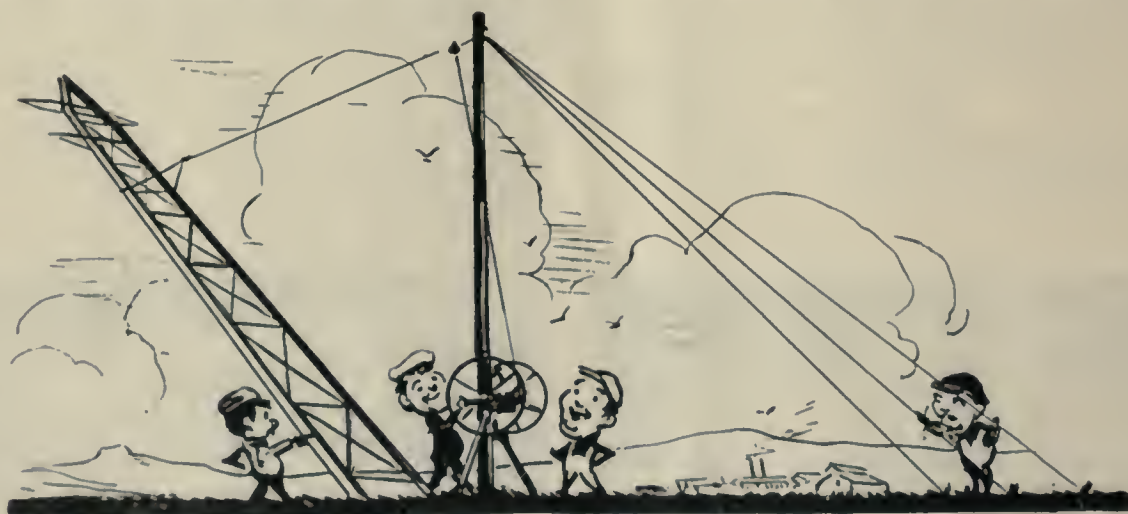
An Extreme Case of Failure to Apply "Horse-Sense"

On one important transmission line there was a stretch of rolling ground having a distance from top to top of the "rolls" practically that of the spans of the line. The "engineer" who made the profile took his

attention between the designing and the constructing branches. A contractor's suggestion may be only an effort to get an "extra," but it is always a good plan to have it looked into on general principles.

Ordinarily the kind of support to be used will be determined first, and the locations and heights afterward. It is possible also that in very rough country, across thickly settled sections and in similar cases, the locations and heights may be fixed and so determine to a considerable extent the character of support required.

If the choice has been wood poles and native wood is used, the poles can generally be purchased delivered at the hole. In this case the seller should be furnished with a schedule giving the pole number and the height of the corresponding pole, together with such notes as



No "pikers" needed. Apply to the foreman of the wood pole gang

levels in the valleys and the office located the towers also in the valleys, bringing the high spots under the middle of the span. Not until the wires were up was it discovered that in this section the lower conductors were normally only 8 ft. from the ground at mid-span.

On the same line at one point a tower was located on a bit of level ground, but just at the foot of a sharp slope. The outside wire on the side of the slope could actually be touched by a "six-footer" at one point. The undoubtedly high cost of the extensions by which the line was given proper clearance would have been saved, and a number of other undesirable but not actually dangerous conditions prevented, had some one familiar with line construction checked the paper location against the actual conditions. For that matter if the "engineer" in charge of the work had listened to the contractor in a spirit other than one of open hostility the same result would have been secured.

In all construction work there should be close co-oper-

ation between the designing and the constructing branches. A contractor's suggestion may be only an effort to get an "extra," but it is always a good plan to have it looked into on general principles. Ordinarily the kind of support to be used will be determined first, and the locations and heights afterward. It is possible also that in very rough country, across thickly settled sections and in similar cases, the locations and heights may be fixed and so determine to a considerable extent the character of support required.

If the choice has been wood poles and native wood is used, the poles can generally be purchased delivered at the hole. In this case the seller should be furnished with a schedule giving the pole number and the height of the corresponding pole, together with such notes as will enable him to find about every fifth stake from local references familiar to him, such as farm houses, roads, etc., or from objects readily seen. With such a list he can deliver without further help from the buyer, but it is much better to have an inspector present. The work then moves faster, provided of course that the inspector knows the line in advance, and disputes and delays from errors are largely prevented.

Poles from outside and treated poles—of which more hereafter—are usually delivered on cars, and must be distributed. Treated poles should be framed before treatment. Other carload poles are best framed in the yard where they are unloaded. Indeed, framing is always best done in the yard, but where, as is usually the case with native poles, delivery at the hole is as cheap as delivery in the yard, this saving more than offsets the gain of yard framing. Where poles are field framed the arms and attachments are put on at the same time, making some saving here. But in a properly arranged



POWER AUGER USED FOR DIGGING TELEPHONE LINE POLE HOLES



SETTING POLES BY CAR DERRICK—POLE HOOKED ON, HORSES HOISTING

yard there is no time lost going from pole to pole, and particularly if the poles are to be shaved, the derrick used for unloading makes a very considerable saving in labor.

It is still the practice, in many cases, simply to roll the poles off the car by hand after as many as can do so have fallen when the stakes are out. This, however, is dangerous to the men, is apt to break some of the poles, and necessitates much additional labor in rolling the poles into piles. A derrick, on the other hand, unloads with safety to men and materials in a fraction of the time, and places the poles where wanted, particularly if, as it should, it has a long boom. A derrick saves the cost of helpers for the framers, and is usually invaluable in handling heavy material, other than poles, from cars to trucks.

A Good Inspector Would Have Prevented This

In order to determine whether the pole was a live cut it is customary to specify that the pole shall not be shaved. This is usually interpreted to allow knot and branch projections, although the latter are usually “to be trimmed close,” so that quite a little draw-knife work is necessary after delivery. Following this, the butt is

cut square, the top roofed, and the gains and faces made. In firm soil the requirement of a square butt is not as essential as in soft soil, where it is very important.

The writer was once delighted with the speed with which a new foreman set poles—until a day or two later, when the crossarms were apparently all that kept them from toppling over. The “villain” had sharpened the butts, dug a hole about a foot deep, wiggled the pole with the spikes after it was up, and moved on to the next!

The roof treatment depends somewhat on the attachments, for there are several special top pin fixtures requiring individual framing. If none of these are to be used, the most general practice is to form a wedge, although an almost equally common method is to sharpen to a point, the pitch angle in either case being about 45 deg. The wedge is usually set with the edge at right angles to the direction of the line, but where roof pins are employed and are doubled the edge should be parallel to the line.

Gains are cut of just the width of the arm, from ½ in. to 1 in. deep at the center. They should be slightly concave, so that the arm will bear on the edges, thus preventing rocking. With the best of care, however, it is difficult



Fig. 1—Pole coming up bank. Fig. 2—Pole nearly up. Fig. 3—Pole in place and nearly lined. Fig. 4—Pole lined, hole being filled

SETTING POLES BY CAR DERRICK

to get a good fit, and as the average "pole butcher" comes far from being careful, there have been developed several patent metal gains, which are lagged or spiked to the pole. These do not require cutting of the pole otherwise and give as good a fit to the arm as the dimensions of the arm permit, for crossarms are not always true to a hair.

Faces are required for many of the patent fittings, and for some that are not patented, for that matter. The shape is of course fixed by that of the contact surface of the fitting, but the face should be at least $\frac{1}{2}$ in. larger all around, and like the gain should be hollowed a little to insure a firm bearing.

After the framing is completed, including the boring of holes for the bolts, all of the cut surfaces should receive at least one, and, better, two coats of some good preservative. If the pole is not to have butt treatment it should also receive at least a "belly band" or belt of preservative extending 1 ft. each way from what will be the ground line when the pole is set.

Some Minor But Important Points in Line Construction

If the pole is yard-framed the attachments will not be installed until the pole has been delivered at the hole. If it is field-framed they go on immediately after the preservative, and there are one or two little points that should be remembered in this connection. For example, bolts should be so driven that the nut is always next the attachment. No one who has ever tried to back out a bolt in order to replace an old crossarm needs to be told why, but there are many so-called "linemen" who do not stop to think of maintenance, and unless closely watched can cause much trouble later on.

The projecting ends of bolts should be cut off close to the nut. This is rarely done, but it should be the rule. With the best of judgment in getting materials and distributing them there will be occasions when it is cheaper by far to use a long bolt on a short grip. The resulting end sticks out like a sore thumb and is a menace to the linemen's clothes if not to their persons.

Care should be taken that the fittings all make the same angle with the center line of the pole. Nothing makes a line look worse than a little variation in crossarms, brackets or other fittings that should line up. It is quite customary to install crossarms but leave the braces free until the poles are set to insure good line, but with reasonably straight poles practically as good results can be secured by completing the work on the ground.

Digging Pole Holes May Be Quite a Job

In ordinary soils digging the hole is a comparatively easy proposition, although it takes a little experience efficiently to handle the lower portion. An ordinary short-handled round-point shovel is much the best tool for the first 3 ft. or 4 ft., and if the hole is large enough for a man to stand in it and work it is best for the entire depth. For most holes, however, a long-handled round-point shovel and a spoon will be required from about 4 ft. on. A pick for the surface and a digging bar for the deeper portions are also needed unless the soil is soft and free from stone. Patent diggers are used in some instances, with varying success;

in general they do not work as well as the usual shovel outfit.

Ordinarily conditions do not warrant the use of power diggers, but on a Western telephone line a gas-line earth auger is said to have been very successful. Unless the ground was fairly free of stone and unless there were a large number of holes the overhead cost would eat up all saving unless the time saved was worth the difference, particularly as the device would have to pay for itself on the job.

Sometimes It May Not Pay to Blast Out Rock

Rock is always a nuisance, and often considerably worse than a nuisance. In the open a heavy charge will often so shatter the rock that it can be readily taken out, but it is important that it is not merely cracked into large blocks, as these are very difficult to handle, while the blocks necessitate heavy charges to further break them up.

Where the rock is at the surface and is of good quality the pole may with advantage be set on the top and held in place by a special shoe stone-bolted down, or by three strap bolts set in holes 120 deg. apart on the outside edge of the butt. Such bolts should extend at least 12 in., or better, 18 in. into the rock, and may be held by filling the space between them and the hole, which should be about $\frac{1}{2}$ in. larger than the bolt itself, with melted lead, sulphur or Portland cement grout. In place of using one of these the end of the bolt may be split to receive a wedge which, when the bolt itself is driven down, jams the sides against the sides of the hole. It is hardly necessary to point out that, if lead or sulphur is used, the holes should be perfectly dry. A little moisture converted to steam by the hot material can throw a small amount of melted lead or sulphur over an astonishingly large area.

The upper ends of the bolts should be about a foot long, measured from the rock, and should be flattened and lagged to the pole. For poles up to 40 ft. high above the rock $\frac{3}{4}$ -in. bolts will serve unless the line is exposed to heavy winds. In the latter case, and for higher poles the bolts should be of inch stock, and the lags should be about 6 in. long as against 4-in. lags for the smaller bolts.

Soft Ground Requires Reinforcing for Pole Support

Very soft material is often even harder to handle than rock. If they are too "quick" and if the poles are not too large, soft soils can be conquered with headless barrels, the hole being started as usual and the barrel then set in it and forced down as the material is taken out by the man inside. When the top reaches the surface a second barrel is set on it, three or four cleats inside keeping it in line. The bulge of the barrels and the poor connection usually limit the "string" to two, giving less than the proper depth just at the point where deep setting is needed. By filling the space between the barrels and the pole with concrete this difficulty is removed.

The hole may be dug inside of driven sheeting, in which case it will usually be made square for convenience. For this a square frame of 6-in. x 6-in. timber, having clear inside dimensions slightly greater than the

diameter of the pole is placed in position and a similar square with inside dimensions greater than the outside dimensions of the first by an amount about $\frac{1}{2}$ in. more than twice the thickness of the sheeting to be used is placed outside it. The sheeting is then set up in the space between the braces and driven down as the excavation inside proceeds.

By sharpening the sheeting so that the cutting edge is

ring of the first set forming the top outside ring of the second set.

If there are many soft holes, by far the best device is a steel cylinder in halves, of a length equal to the deepest hole required, and a diameter sufficient for the largest pole. The outside should be free from any projections, the clamps coming inside, and there should be two stout rings on each half. It is used just as are



Fig. 1—Lifting. Fig. 2—Ready for pikes. Fig. 3—First pikers piking. Fig. 4—All pike poles in, note butt man twisting pole with cant hook. Fig. 5—Jinny at end of its service. Fig. 6—

Butt sliding into hole. Fig. 7—Pikes grounded, butt man giving last twist before filling in. Fig. 8—Pole in place and lined up, hole being filled.

SETTING POLES BY HAND

at the outside and slants to a point on the edge next to the previous piece it can be kept fairly straight and tight, but additional bracing rings should be set inside every 3 ft. or 4 ft. If the hole is much more than 6 ft. deep it may be necessary to use a second set of sheeting, in which case the first set should form a square enough larger than the required hole. With 6-in. bracing and 1½-in. sheeting this would require 15 in. additional width and breadth in the top, the bottom inside

barrels, but after the pole has been set it is pulled out by tackles or jacks and taken off the pole by separating the halves. It is then ready for the next hole.

How Deep Should Poles Be Set?

The question as to what should be the depth of setting has been answered in different ways by different people, but the values adopted by the American Elec-

tric Railway Association have been largely used. They are as follows:

Length of pole in feet	Depth of Hole	
	In rock or with concrete setting	In earth
30.....	5 ft. 0 in.	6 ft. 0 in.
35.....	5 ft. 6 in.	6 ft. 0 in.
40.....	5 ft. 6 in.	6 ft. 6 in.
45.....	6 ft. 0 in.	6 ft. 6 in.
50.....	6 ft. 6 in.	7 ft. 0 in.
55.....	6 ft. 6 in.	7 ft. 6 in.
60.....	7 ft. 0 in.	8 ft. 0 in.
65.....	7 ft. 0 in.	8 ft. 6 in.
70.....	7 ft. 0 in.	9 ft. 0 in.

In very compact soil values intermediate between rock and earth may be used, while if one-third or more of the bottom part of the hole is rock, rock values will be ample.

Economy in Man-Power Is Essential in Pole Raising

The poles having been framed and delivered and the hole dug, it remains to erect them. The good old-fashioned way is to pike them up by hand. A board is stood up at one side of the hole, and the pole brought up with the butt against this and resting on a short piece of plank on the opposite edge. One man with a cant hook stands at the butt to keep it on the plank. Another holds the "jinny," which is a substantial prop of Y-shape about 7 ft. long. The rest of the gang lift the top, starting at the top and walking toward the butt as it rises, while the jinny man follows along to prevent any drop in case the men should slip.

As soon as the top is 8 ft. or 10 ft. above the ground the two first pikers "stick" it and lift as far as they can. The others in turn "stick" in pairs and lift, each pair moving in in turn and "sticking" again as the lift takes their point out of reach. Meanwhile the jinny man keeps his prop close against pole and ground as long as it is effective, which is until the pole is at an angle of about 60 deg. with the horizontal. As it approaches the vertical the butt man twists it if necessary to keep the arms properly lined. When fully up it is plumbed, or raked as the case may be, by the foreman, and then is held in position by grounding the pikes in a circle about it until the hole is well filled.

Chestnut poles require, roundly, as many pairs of pikers as one-third of the pole length in feet, together with one jinny man and one butt man for poles up to 45 ft. long. Two butt men are required for longer poles. Cedar poles are considerably lighter, and the gang for the shorter lengths may be reduced by a pair of pikers.

Mechanical Pole-Raising Devices Have Their Place

To-day, however, the tendency is to employ some form of mechanical setter, either in the simplest form, a gin pole, or, if the extent of the work warrants, a more elaborate form of derrick mounted on a car or truck and operated by hand winch, horse tackle or gasoline hoist. With these there will be required four laborers, a driver, or an operator, depending on the form of hoist, two men to hook on to the poles, one of whom can also serve as butt man, and one or two pikers for lining up. For the shorter poles there is not much if any saving in number of men, the economy coming in the greater speed. For the longer poles there is a large saving both ways, and there is far less liability of accident.

If the pole is to be subject to heavy strain it is now "keyed" with wood, stone, or concrete, at least 4 in. thick, and with a cross-sectional area not less than 32 sq.in. One key, at least 2 ft. long, is placed on edge at the bottom of the hole on the side opposite the anticipated strain; the other, 4 ft. long, is placed on edge at the surface, on the side of the strain. At least, this is the case in firm soil; in soft ground the keys may have to be considerably larger, or the desired result may be secured by filling the hole with concrete.

Whether the re-fill is earth or concrete it should be put in in layers and well tamped. There should be at least three men tamping to one man shoveling, and the material should be piled up in a little mound around the pole both to shed water from it and to prevent the formation of a small pond by the settling which is sure to occur. If there are pieces of rock available these should be saved for the upper part of the hole unless needed to stiffen up a soft bottom. In the latter case it is often desirable to make a "pancake" or "biscuit" of concrete, 6 in. or 8 in. thick, in the hole.

If carefully lowered, a pole can be set on such a bottom in about thirty-six hours after the concrete is placed, but it is better to let the converter set for a week. If it must be used sooner, a cushion of earth about a foot deep will help maintain the virtue of the green concrete.

Insulators Replaced on a 23,000-Volt Live Line

THE Elmira Water, Light & Railroad Company recently changed the insulators on one its 23,000-volt lines without interrupting service. The old insulators gave considerable trouble due to breakdowns especially during electrical storms, and the only way to remedy the trouble was to install insulators designed for higher voltage. This line is 20 miles long and so important that shutting it down for intervals necessary to change over the insulators was not to be thought of. The problem of substituting the higher voltage insulators was solved by the use of some patented special tools designed by the Georgia Railway & Power Company.

When the work was first undertaken the men were somewhat timid but with a few days' experience they developed confidence and speed so that the gang of three men averaged sixteen poles per day. The handles on the tools with which the wire was gripped were from 6 ft. to 12 ft. long and so well insulated that at no time was the slightest shock experienced. The only sensation felt was due to a static discharge which took place whenever a tool touched the live wire. This was loud enough to be heard by the men on the ground.

The method used in replacing the insulators was as follows: There were two pole pins and an inside pin on each arm. A short ladder was hooked over the arm in order to work on the outside pin. The tie wire was then cut by using a bolt cutter with a 3-ft. wooden handle and the live wire was lifted from the insulator by using a special anchor pole with a block and fall attached to the ends. This held the wire in an elevated position where it was then pulled over by guy lines. The insulator was then replaced and the wire again lowered into place by using the block and fall.

What Is the Cure for Condenser Tube Corrosion?

Longer Life Will Be Secured from Condenser Tubes by Proper Selection of Material and Care in Manufacture Rather Than by Modification of Conditions Directly Under the Control of the Operator

By Hartley LeH. Smith

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IN THE modern power plant, operated with surface condensers, corrosion of the innumerable and tiny tubes which make up the "internal economy" of the condensing apparatus has long been the bane of the operator's existence. There is daylight ahead, however, in this matter for, like most of the problems of these days of increasing use of research methods, the condenser tube problem promises a real solution at no very distant date.

For many years the development of ideas concerning tube corrosion was very slow, but recently it has been greatly accelerated. The earlier condition was due partly to the fact that, important as the matter seems to power house operators, the corrosion of condenser tubes is only a part of the general corrosion trouble. In the whole field it is of relatively minor commercial significance. If, however, iron and steel corrosion are excluded, as well as that of the alloys used in engineering structures, the waste of money occasioned by the short life of condenser tubes becomes relatively very important. In fact, it is so large as to be exceeded by few other wastes among applications of alloys in which the corrosive influence is a factor. It is worthy of careful study.

The whole corrosion difficulty has been attacked with great vigor in recent years, both theoretically and experimentally. Theories have been extensively modified and, as is generally the case where this occurs, progress in experimental lines has kept pace with the theory.

Electrolysis Has Been Blamed for a Great Deal of the Corrosion

An important fact in this connection is that but a few years back many of the large steam turbine condensers were equipped with Muntz metal tubes. Another is that in the early days it was quite commonly supposed that much condenser tube corrosion was caused by electrolysis from the return current of electric railway circuits.

Expensive experimental installations were made in a few cases for the purpose of electrically insulating the condensers. Another line of experiment consisted in coupling a special motor-generator set to the condenser so that electric current of considerable magnitude would flow from the condenser shell to the tubes. This idea has been very persistently advocated in England, where it has produced the "Cumberland system" of condenser protection.

Another, and fairly recent, theory of corrosion is that electrolysis may occur without the assistance of electric currents from outside. The idea is rather that corrosion of apparently homogeneous metals occurs through

the operation of tiny local electric circuits. These may be almost molecular in dimensions. They are produced by non-uniformity in the metallic structure, or perhaps it would be more accurate to say in the metallic micro-structure to indicate the diminutive character of the action.

Muntz Metal Is Very Susceptible to Salt Water Attack

It is well known that Muntz metal is attacked quite vigorously by salt water. This metal contains two constituents known as "alpha" brass and "beta" brass. Under microscope these two constituents can be easily distinguished. The "alpha" constituent is a solid solution of zinc in copper which may contain, under circumstances dependent upon heat treatment, as much as 37 per cent zinc, and which, when less than 30 per cent zinc is in the brass, is the exclusive solid solution present. It is a comparatively soft and very ductile body. The "beta" constituent is a solid solution of zinc in copper which is always present when brass contains more than 37 per cent zinc. This constituent is much harder and stronger than the "alpha" constituent but it is at the same time much less ductile.

Each pair of these constituents can act as electrodes in local electric circuits when an electrolyte is present—for example, salty circulating water. These electrodes, that is the "alpha" and "beta" constituents, have very considerable inherent potential difference. There can scarcely be any doubt that this circumstance explains, for the most part, the special susceptibility of Muntz metal tubes to corrosion by salt water. This conclusion will, I believe, be supported by all who have used such tubes with salty circulating water, or certainly it will be supported by those who, having used them, have changed to Admiralty metal tubes.

Admiralty metal contains 70 per cent of copper, 29 per cent of zinc and 1 per cent of tin, while Muntz metal contains 60 per cent of copper and 40 per cent of zinc.

Electrolysis Theory Applies with Admiralty Metal Also

Any brass having as much copper as Admiralty metal consists of a single solid solution of zinc in copper, that is, "alpha" brass. This is true of all brass alloys still more rich in copper.

While the electrolytic theory of corrosion still serves to explain, or at least helps to explain, the corrosion of Admiralty metal tubes and other "alpha" brass alloy tubes, it is evident that the homogeneity of the crystals of the single "alpha" solid solution is much greater than in the case of Muntz metal. The theory requires the



You knew little about your condenser tubes until the microscope told the story

presence of tiny electric currents due to lack of uniformity, but obviously the potential differences are very much less in this case than those which exist between the crystals of the "alpha" and "beta" solution of brasses having copper of about 60 per cent and zinc of about 40 per cent, of which Muntz metal is an example.

The point is often made that if 70 per cent copper is so much better than 60 per cent copper, why would it not be still better to use 80 per cent or 90 per cent copper or alloys even richer in copper than this?

There are several reasons for the use of a limited percentage of copper. In the first place, copper is more expensive than zinc, therefore the cost of the tubes rises with increasing copper content.

Why Not Use Condenser Tubes of Pure Copper?

Another important fact, already mentioned, is that brass containing as much as 70 per cent of copper or more consists of one rather than two solid solutions; that is, the "alpha" rather than the "alpha" and "beta" metal. It follows that once the "beta" constituent has been removed there is no further improvement to be effected by the addition of more copper.

It is true, of course, that as electrolytic corrosion goes on, it is the zinc which is dissolved and the copper which remains. The honeycombed structure which is left is very weak mechanically and is broken easily by vibration. It follows, therefore, that the less zinc originally in the tubes to be dissolved, the less is the resulting weakening of the tube as it deteriorates throughout its life.

Carrying this argument to its conclusion one might ask: "If the less the zinc in the tube the longer its life, why not use an all-copper tube?" The answer to this is that the omission of the zinc would be undesirable as a manufacturing matter. It appears from the metallurgy of tube manufacture that copper oxide is produced in the making of tubes and this is very soluble in molten copper. Copper oxide in a tube is very bad. Zinc in alloying with copper takes care of the oxidizing effect.

Many engineers believe that a little zinc will perform this oxidizing service as well as a great deal and that, therefore, condenser tubes of progressively higher copper content should have correspondingly longer life up to, say, 95 per cent of copper. To offset this increasing merit would only be the corresponding higher cost.

While the above opinion seems to be quite widespread among engineers, it cannot be said as yet that the use of tubes so rich in copper has been tried long enough in a practical way firmly to establish the validity of the theory. Certainly it is not established to so great an extent as the fact that Admiralty metal tubes are superior to Muntz metal tubes for condensers with water more or less salty in character. It may be said in passing that a tube of 70-per cent copper and 30-per cent zinc composition, possessing the merit of a single solid solution, "alpha" brass, is considered less durable for salt water service than one containing a slight amount of tin, hence the popularity of the well-tried Admiralty metal. The role played by the tin in giving this added protection is, however, not well understood.

So far we have discussed the chemical composition of

tubes as affecting their durability against corrosion, but there are other factors which have an important bearing on the subject. Some of the most important work done in this line is so recent that manufacturers have not as yet had time to provide equipment to make the fullest use of it.

Before taking up this latest work it may be well to state first that for some years engineers have felt that very important influences were at work, other than variation in chemical composition, which would account for tube deterioration. These men were convinced that not much improvement was to be secured until these factors had been identified and brought under practical control.

The investigators turned naturally to the microscope to assist them, and the character of grain structure and its relation to annealing were carefully studied. The literature of this subject is now quite extensive.

In spite of all this study, however, it did not seem possible to distinguish accurately between good tubes and poor tubes. About five years ago, however, the brass industry got a very heavy "jolt" which brought about important investigations and had far-reaching effects.

On the New York State Barge Canal work, and also earlier, on the Panama Canal work, large quantities of brass and bronze were used under conditions subjecting the material to considerable stress. These materials had been chosen under the circumstances as substitutes for steel in order to insure against corrosion. The structures in which they were used were carefully designed for the applied stresses.

In no small number of cases these materials failed, causing genuine alarm among engineers for the safety of some of the structures in which they were used. The result was a decided skepticism as to the suitability of such alloys for structural purposes. In some cases steel was substituted for the alloys.

In the investigation which followed the United States Bureau of Standards took a leading part, applying its rigorous research methods to this work. The result seems to have been very satisfactory.

What is the Cause of "Season Cracking?"

One evil to which alloys are subject, known as "season cracking," has long been widely known in the brass trade. It has seemed in some way to be connected with moisture conditions. Brass and bronze kept quite dry might be entirely free from this trouble even though long in service, whereas these alloys kept in storage and, therefore, subject to no stress at all, might give evidence of "season cracking" if subjected to moisture conditions. The failure of such alloys in service when subjected to high but carefully calculated stresses and to corrosive influences have already been commented upon.

In a general way it was known fairly accurately that "season cracking" was related to internal strains produced in manufacture and not subsequently removed. Recent investigation has clarified and amplified our knowledge of the whole subject, however, very much indeed. We now know that "season cracking" and "corrosion cracking" are one and the same. Consequently an organized effort to allow the former term to die out of use meets with no opposition.

We now know that "corrosion cracking" and initial

tensile stress are not only associated phenomena but also that without the latter "corrosion cracking" does not occur.

Initial tensile stress, which is a cause of corrosion cracking, is bound up with the matter of electrolytic solution potential. Some of the best recent research work seems to establish definitely that this potential increases continuously with tensile stress.

The way in which corrosion cracking comes about is therefore as follows: Newly manufactured metal, say brass condenser tubing, is in a state of initial stress of such nature that the surface layers are in tension. There is always sufficient lack of homogeneity on the surface to start electrolytic corrosion if an electrolyte is present. This may be assumed to be the case when the tubes are in service in a condenser.

The early surface corrosion grooves the surface and, as it is a law of mechanics that the unit stress at the bottom of a groove is far higher than the average stress over the surrounding section, the early surface corrosion produces higher unit stresses at the bottoms of the grooves as these deepen.

We have assumed a case where the initial surface stresses are tension stresses. Therefore as the grooves deepen the electrolytic solution potentials at the bottoms of the grooves increase, and as this occurs the differences of potential between the bottoms of the grooves and the general tube surface are increased. As a consequence the electrolytic corrosion is not only maintained but accelerated.

What Are We Going to Do About It?

Now as to some hope of cure for these ills. Initial compression unit stresses seem harmless—that is, they do not seem to favor corrosion cracking. The reduction of initial tension stresses from the high values, which are often very high indeed, is obviously a cure for the evils caused by high-tension stresses.

Either one of these conditions may be deliberately brought about by a finishing operation during manufacture. Annealing after the final drawing, with the annealing temperature kept to the low figure of 400 deg. C., or thereabouts, will completely remove the internal strain. At the same time it will produce a finely grained microstructure, completely eliminating the coarse structure which results from annealing at temperatures within or above the critical range.

This very important conclusion of recent research work will doubtless in the near future be much better appreciated than it is to-day. As yet the brass works are not generally equipped with the control apparatus needed for the maintenance of such low annealing temperatures.

As a substitute, however, efforts are being made so to spring the metal after the last drawing as to change the stresses which have resulted from cold working, from tension stresses at the surface to compression stresses. This is being done with a fair degree of success in the case of brass rods, but whether it can be done with similar success in the case of seamless tubes, the writer cannot say at the moment. In this connection, however, it must be remembered that the present advance in this field is very rapid, both in research work and manufacturing.

A very pertinent question with which to close the

present discussion is this: "What are some of the main features which are being embodied in progressive condenser tube specifications?" In answering this question it would be well to state that these features will undoubtedly become much more important in the near future, as they have for their purpose the securing of tubes which will stand difficult corrosion conditions with sufficient durability to cut down condenser maintenance costs. Moreover, they will tend to eliminate general power station troubles resulting from contaminated hot-well water. This is a very serious item of power station expense where circulating water is in any way bad.

Modern Condenser Tube Specifications Are Quite Comprehensive

Among the items which may well be included in these specifications are the following:

Chemical Composition: (a) Such as will exclude the "beta" solid-solution constituent. (b) Presence of small amount of tin (about 1 per cent) if condenser water is salty. (c) Limitation to very small quantities of those elements generally believed to be injurious, such as lead, iron, arsenic, cadmium.

Initial Surface Stresses: (a) Elimination of such stresses by low-temperature annealing after final drawing. (b) Creation of initial surface compression stresses after final drawing by deliberate springing as a possible substitute for (a).

Grain Size: Specification of grain size and enforcement of the specification by grain-size measurement, using one or another of the authoritatively recognized methods.

Hardness: Specification of hardness number on some recognized scale, preferably the Brinell.

Applying Gas Welding in the Boiler Room

IN THE boiler rooms of the Doherty properties in Toledo, Ohio, all bagged and leaking boiler tubes are being welded by the oxy-acetylene process. William Long, superintendent of production, states that as many as fourteen welds have been made on one tube before it was discarded. The process is first to heat the bag on the tube with the torch, using a slow heat until the bag is a bright cherry red. The bag is then driven back, beginning at the outer edge and working in toward the center. In case there is a hole in the bag this is first welded shut. Boiler tubes are also being reclaimed by welding sections of tubes onto damaged tubes that have been removed. The cost of welding is approximately 75 cents per single weld, including all labor, material and cost of setting up the apparatus. When several welds are made on one boiler, the cost is less.

Crystallized boiler tubes are also being successfully annealed by use of the oxy-acetylene process. The two ends are heated to a bright cherry red and allowed to cool, after which they are rerolled and given a hammer test. After treatment the tubes are found to be as soft as new ones.

The Toledo Railways & Light Company reports that by use of these methods a great saving is being made in boiler tube costs. The process is another illustration of the extent to which modern welding is being applied in all technical fields.

Forces Acting Directly or Indirectly Upon the Truck Side Frame

By Norman Litchfield

The Author Concludes His Series of Articles on Electric Railway Bodies and Trucks by Considering the Factors Which Affect Side Frame Design

IN AN ARTICLE on a few of the engineering principles entering into truck design in the Mechanical & Engineering edition of the JOURNAL for July 20, certain forces were enumerated as being largely controlling. At the risk of repetition, and for the convenience of the reader these may be listed again, as follows:

1. The weight carried with car standing straight.
2. The shifting of the weight from the center of the truck partly to one side by the action of centrifugal force.
3. The shifting of a portion of the load from the rear to the front trucks by action of the brakes.
4. A similar shifting of the truck load from the rear of the truck to the front by action of the brakes.
5. Forces set up by the torque of the motor through the motor nose during periods of acceleration.
6. The so-called "flywheel effect" or tendency of the rotating parts of the truck to continue rotating during periods of retardation.
7. The forces set up by the friction of the brakeshoes on the wheels, and transmitted to the truck structure through the brake hangers.
8. The distortional effect of the horizontal force applied to one corner of the truck by virtue of the thrust of the forward outer wheel against the rail in rounding curves.

To these might be added a somewhat similar distortional effect of inequalities and depressions in the track.

Truck Loads Are Not Uniformly Distributed, by Any Means

In considering the forces acting on the side frame and the stresses thereby induced, it is to be remembered that primarily the side frame is a beam or a truss, designed to carry a load more or less centrally applied at the truck transoms. It is supported by two abutments which as a general rule are springs, either helical or elliptic, located near or over the journal boxes.

The primary load transmitted through the transoms to each side frame is, of course, one quarter of the total car-body weight, including passengers. In the previous article on bolsters it was pointed out that the effect of centrifugal force on a car rounding a curve is to relieve the center plate of a portion of its load and to throw a corresponding load on the outer side bearing. By reason of this action the bolster no longer presses with equal force on each elliptic spring, but throws a greater

load on the outer one and so throws correspondingly greater load on the side frame at the outside of the track curve. The total load carried by the side frame between its supports consists of this eccentric load on one spring, plus a portion of the bolster weight, the weight of the spring itself plus its swing hangers, etc., and a portion of the weight of the transoms and brakebeams, motor weight, etc.

As it is desired to conclude the present series of articles on car construction with this number, it seems well to omit any detail calculations of the forces and stresses, and simply point out the general lines along which a study of design may be followed.

The effect of the centrifugal force having been covered in its relations to shifting of the load from one side of the truck to the other, the next condition to consider is the transferring of a portion of the car-body load from the rear center plate to the front. This will occur during an application of the brakes, the effect of which

is readily seen after a short study of the conditions. To make this clear the reader should be reminded that the retarding force of the brakeshoes has to be applied to the car body through the center plate, at a point about 3 ft. above the rail,

whereas the center of gravity of the car body and its passenger load is some 7 ft. above the rail. Consequently the effect is somewhat similar to a pedestrian stubbing his toes, causing him to fall forward.

How the Weight Transfer Force Is Calculated

To determine what the force is which produces this weight transfer we may proceed as outlined in the following: Electric passenger cars are now customarily equipped with brakes designed to give a braking force at the wheels equivalent to about 110 per cent of the weight of the car without its passengers. That is to say, an empty car weighing 50,000 lb. would have a braking force applied in service application of 55,000 lb., or if a light-weight car, a force of 6875 lb. per shoe. This is figured with a cylinder pressure of 50 lb. per square inch. With the brakes applied in emergency the cylinder pressure increases to 60 lb. per square inch and the maximum braking force will then run up as high as 132 per cent of the light weight of the car. The pressure of the braking force applied to the shoe is, of course, radial on the wheel, and its stopping or frictional effect will depend upon the nature of the wheel and of the brake-shoe itself. But in general it may be assumed that at the speeds under consideration the maximum coefficient of friction between shoe and wheel will amount to about



Truck parts must withstand these excessive strains from emergency stops

0.25, thus giving a tangential frictional force of $0.25P$ where P is the total radial braking force.

Not all of this frictional force, however, is available for stopping the forward motion of the car itself. A portion of it is used up in overcoming the stored-up energy in the rotating parts, including the wheels, axle, gears and motor armatures, which tends to keep these parts in rotation. The effect of this is especially noticeable in the case of the motor armature. This is evidenced by the fact that a truck without motors cannot successfully utilize a braking pressure of much more than 85 per cent on account of the danger of sliding the wheels under poor rail conditions. The same truck with motors can be braked up to 110 per cent as before stated. This matter is fully discussed in Richey's "Electric Railway Handbook," page 172, under the caption "Ratio of Linear Inertia to Total Inertia." In this he states that for a high-speed electric motor car this ratio will vary from 0.935 to 0.91.

If we assume that a braking force equivalent to 25 per cent of the light weight of the car is used up in overcoming the energy of the rotating parts, then with a maximum braking force of 130 per cent in emergency, 105 per cent would be available for stopping the car and, allowing 0.25 as maximum coefficient of friction between wheel and shoe, the actual retarding force becomes $F = 1.05W \times 0.25 = 0.2625W$.

Retarding Force Is Divided Between Body and Trucks

The total retarding force may be considered as divided between the car body and the trucks in proportion to their respective weights. Thus if C be the weight of complete car, B that of body, and T that of trucks, the retarding force acting on the body will be $F_1 = 0.2625 \frac{B}{C} W$.

As before pointed out, the center of gravity of the body and passenger load is 7 ft. above the rail and the center plate about 3 ft. The onward impelling force of the inertia of the loaded car body and the retarding force applied at the center plate form a couple 4 ft. apart. If L be the distance between front and rear center plates, the downward force at the front plate caused by the turning movement of the couple will be:

$$P = 0.2625 \frac{BW}{CL}$$

This force must be added to the weight on the front center plate to give the total load carried by the front truck. Inasmuch as this force is not affected by centrifugal force of the car rounding curves, one-half may be considered as caused by each truck side frame.

At the same time that the retardation causes a downward force to act at the front center plate, a similar upward force of equal intensity is induced at the rear center plate, and thereby correspondingly lessens the load on the rear truck.

This Force Acts Through the Center Plate Also

Another factor which may affect the load carried by the side frames is the downward force on one transom of the motor nose and a corresponding upward force on the other transom from the other motor, assuming that the truck carries two motors. Each force amounts as a maximum to about the weight of the motor itself. But inasmuch as there is little likelihood of the maximum

torque of the motors occurring at the same instant as the exertion of the maximum retarding force of the brakes, this feature may be omitted from consideration and the forces acting on the side frame be limited to those coming from the weight carried and the action of the brakes.

Truck Is Subjected to a Turning Moment During Braking

Having given consideration to the forces acting through the truck center plate, attention must next be paid to the forces acting within the truck structure itself. The retarding force, which as explained applies a turning movement to the car body, adding weight to the front center plate and taking from that on the rear plate, also applies similar turning movements to the trucks. This tends to lift the rear pair of wheels of each truck.

Thus, the inertia of the car body applies a horizontal force at each center plate equal to one-half the force of retarding the car body (if both trucks are of equal weight), and the inertia of the truck a horizontal force

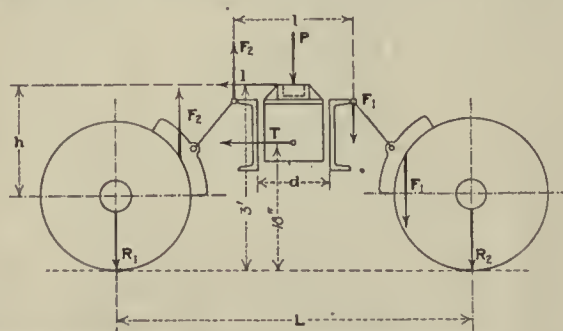


DIAGRAM SHOWING THE FORCES CONCERNED IN THE DESIGN OF A TRUCK SIDE FRAME.

at the center of gravity of the trucks about 18 in. above the rails, equivalent to the force exacted in retarding the truck.

In addition thereto, there are the vertical forces set up by the friction of the shoes against the wheels and applied to the truck structure through the brakeshoe hangers and transoms. This couple is opposite in direction to the others, tending to raise the front end of the truck and depress the rear.

How the Several Truck Forces Combine

To make these points more clear, reference to the accompanying figure will show that the inertia of the body I exerted against the front center plate exerts a downward force at R_1 equivalent to $\frac{3I}{L}$, and similarly the inertia of the truck T a corresponding downward force $\frac{1.5T}{L}$.

The couple exerted through the brake hangers is $F_1 \times l$ and the upward force at R_1 is $\frac{F_1 l}{L}$.

To sum up then, the forces acting directly on the side frame at the outside of the track curve are as follows:

The load applied at the transoms consists of one-half the dead load on the center plate, augmented on the one hand by a transference of weight from the rear truck to the front by braking action, and further augmented by the shifting of a portion of the load from the center

plate to the outer side bearing by action of centrifugal force.

The vertical forces at the transoms due to the turning movement produced by the horizontal retarding force at the center plate, $I/2$, which is applied at a distance h above the center of the wheel. This may be taken as the horizontal point of support of the frame against retarding forces. The distance between transoms being d , the vertical forces induced are $\frac{I}{2} \times \frac{h}{d}$ downward on the forward transom and upward on the rear transom.

The vertical forces at the transoms due to the friction between the shoes and the wheels, equal to the brakeshoe pressure times the coefficient of friction between shoe and wheel, upward on the forward transom and downward on the rear.

The algebraic sum of these forces gives the net force at the transom.

Applying the Principles in the Side Frame Design

The side frame between supports may be treated as a simple beam and the bending moments calculated.

The stress that may safely be allowed in the side frame will depend upon the character of the structure and the service to which it is to be put. As somewhat of a guide, however, it may be pointed out that under the conditions given for the calculation, axles which are subject to the maximum of vibration and reversals of stress run successfully at stress of 15,000 lb. per square inch and over. Therefore it would seem that the side frames could also be stressed equally high. Against this, however, are the facts that passenger car axles are made of special steel designed for its exacting work, while the side frame material may be of more or less uncertain character.

Furthermore, it should be remembered that the frames are of more or less complex construction and liable to have points within where the so-called localization of stress occurs. That is to say, there may be short stretches where the stress will run very much higher than is general throughout the structure. Localizations of this character have been proved conclusively to exist in many structures by laboratory tests through the use of strain gages. These gages consist essentially of micrometers for measuring the elongation of the structure between any two points. Ascertaining the proportion of this elongation to the original length and with a known modulus of elasticity of the metal, the local stress may be calculated.

In addition to the vertical loads on the side frame attention must be given to the transverse loads due to the sidewise thrust of the outer wheels against the rails. In this case the side frame acts as a beam loaded at the middle and supported at the ends at the center lines of the wheels.

The distortional effect of the thrust against the outer wheel and also that of inequalities of the track are difficult of analysis and are generally met in the design by a proper combination of gusseting and flexibility of transom construction.

It is obvious that in the limits of these papers on car and truck construction little more than the most salient points could be covered. It is hoped, however, that they may be of service in pointing out the lines along which one interested may pursue investigations.

Will a Cushioned Gear Save Power in Car Operation?

The Energy Expended in Vibration and Shocks Is Commonly but Improperly Included with the Gear Losses

BY G. W. REMINGTON

Assistant Engineer, Division of Passenger Transportation and Housing, Emergency Fleet Corporation

THE tremendous amount of energy wasted annually in the ordinary spur gearing used in the motor car equipment of our street railways is not generally appreciated by operating men and others interested in fuel economy. This gearing universally employs the involute type of tooth, and power is transmitted through sliding contact. Friction is therefore bound to be present and every operating man endeavors to reduce this to a minimum by considering his own local conditions and by applying such lubrication as he finds practical.

The graph in Fig. 1 gives the losses in gears and bearings found as an average of many tests in which two railway motors were mounted on a testing stand, one

driving the other as a generator through standard gearing of the kind in question. It is impossible, or at least impracticable, to provide the user with gears in which the tooth pitch, profile, etc., are perfect, and as a result vibration of the entire motor is

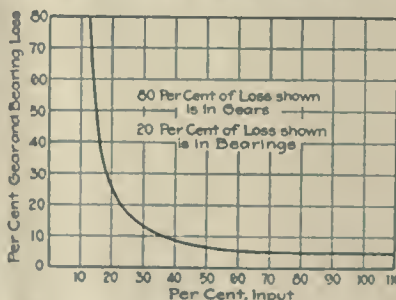


FIG. 1—GRAPHS OF LOSSES IN GEARS AND BEARINGS OF RAILWAY MOTORS

very noticeable when commercial shop tests like the above are made. The energy required to produce this vibration is charged to gear loss and appears as such in the curve shown, though, correctly speaking, it is a loss incident to the use of gears as now constructed.

High rail joints, special work, flat wheels, poor alignment of track and normal roughness of the track itself are largely responsible for the breaking of gear teeth in service and the general deterioration of the motor equipment, the vibrations from these causes being added to those due to the gear teeth. It is therefore safe to say that the so-called gear losses when the motor is running on the road are considerably in excess of those shown in Fig. 1 even when the gears, armature and axle linings are new. When the armature and axle linings wear, and the pinion and gear centers in consequence recede from each other, and when the pinion and gear teeth wear, the efficiency of the gearing decreases in proportion so that, all told, the curves shown in Figs. 1, 2, 3 and 4 represent ideal conditions and minimum gear losses.

Fig. 2 shows the characteristic curves of a motor having a commercial (one-hour) rating of about 110 hp. and include the speed, torque and efficiency, with gears, at 600 volts. Looking at these curves, in conjunction with that shown in Fig. 1, it appears that at full load of 160 amp. the gear loss is 4 per cent or 3840 watts, the torque 2050 lb. and the speed 20.2 m.p.h. As the actual gear (friction) loss should decrease directly with the torque and increase directly with the speed, the loss at

56 amp., which is a fair estimate of the average load when the car is making a stop every 2 miles, might reasonably be expected to be about

$$\frac{3840 \times 31 \times 440}{20.2 \times 2050} = 1263 \text{ watts.}$$

This is only 3.76 per cent of the input, whereas the average of many tests shows 8.65 per cent, a discrepancy which is accounted for by the energy wasted in vibrating the motor.

As an example of what this loss amounts to, we may assume a 30-ton car making a stop every 2 miles and a schedule speed of 28.6 m.p.h. Were this car to run 90,000 miles during the year on a system where the distribution efficiency from generator bus to trolley wheel is 80 per cent, the calculated energy required at the bus is 213,000 kw.-hr. This figure drops to 190,000 kw.-hr. if the over-all motor efficiency is increased by an amount which it seems reasonable to believe would accompany the elimination of the vibration due to gear teeth alone.

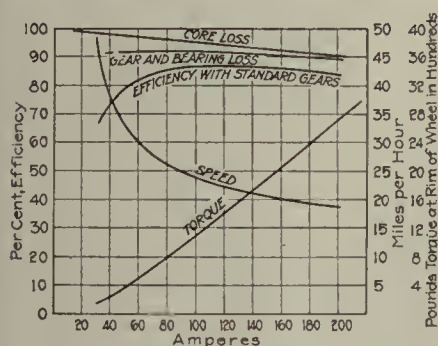


FIG. 2—CHARACTERISTIC CURVE FOR 110-HP. RAILWAY MOTOR STANDARD GEAR

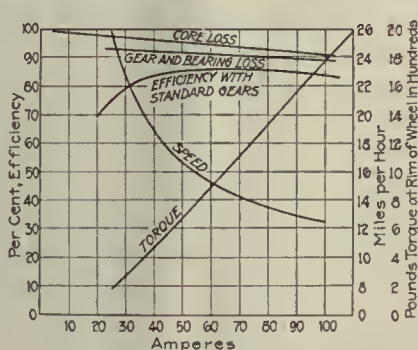


FIG. 3—CHARACTERISTIC CURVE FOR RAILWAY MOTOR WITH STANDARD GEAR

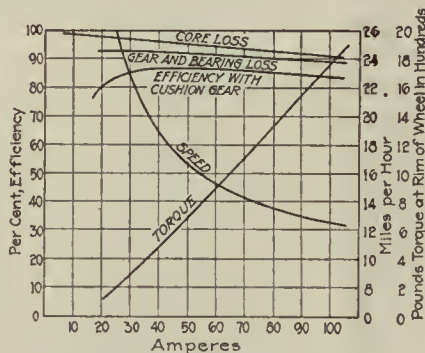


FIG. 4—CHARACTERISTIC CURVE FOR RAILWAY MOTOR WITH CUSHION GEAR

The result would be a saving of 23,000 kw.-hr., or about 35 tons of coal per year for each car so operated.

In city service the average load on the motor can be somewhat nearer full load for the reason that the time power is on is a comparatively small proportion of the total time which the motor has to radiate its heat and the gear losses are not, therefore, as large a proportion of the total input as when the stops are infrequent. We will assume a 20-ton car making seven stops per mile and a schedule speed of 10.68 m.p.h. Using the characteristic curves of the motor on 525 volts shown in Fig. 3, we see that were the motor to run 40,000 miles during the year on a system where the distribution efficiency is 80 per cent, the calculated energy required at the bus is 124,000 kw.-hr. This figure drops to 107,300 kw.-hr. if the over-all motor efficiency shown in Fig. 4 is used, thus showing a saving of 16,700 kw.-hr., or about 25 tons of coal per year for each car so operated.

It would seem that what is required is a cushioned gear. Such a gear has not been developed perhaps because operating men have failed to give the subject the consideration which it deserves. It is unnecessary to say that the spring gears now in use on certain locomotives were not employed with the object of conserving power and there is some doubt whether springs form a suitable cushion. Rubber offers much greater possibilities, both as to cost, reliability, and the characteristics which govern the amount of compression produced by a given force.

Summarizing, then, the possibilities which lie along this line, it may be suggested that such a gear would: (1) Have a first cost considerably higher than the ordinary gear. (2) Prolong the life of both pinion and gear. (3) Have a replacement cost involving only the purchase of the rim bearing the teeth. (4) Be more readily substituted for a worn gear. (5) Materially increase the life of armature windings, brush rigging, and all mechanical parts now deteriorated by vibration. (6) Greatly decrease flashing at the commutator. (7) Facilitate a smoother, and therefore more rapid, acceleration and braking of the car. (8) Be quieter in operation. (9) Offer excellent possibilities of saving at least 10 per cent of the present total power input to the car, without the installation of instruments or the keeping of an additional set of records.

It is probably no exaggeration to say that were the blows to the car body not cushioned, transportation by rail would be impossible and the maintenance and depreciation of roadbed, track and rolling stock would be

prohibitive. The facts that the railway motor is a very rugged piece of apparatus and that the vibration is not felt by the passengers are perhaps responsible to a great extent for the lack of development along this line which would appear to be well worth while.

Axle Generators for St. Paul Locomotives

One of the features used on the Baldwin-Westinghouse locomotives being built for the heavy passenger service of the Chicago, Milwaukee & St. Paul Railway is the axle-driven generator. This was referred to briefly in the description of these locomotives given in the *ELECTRIC RAILWAY JOURNAL* of Feb. 2, 1918, page 237. There are two of these generators, mounted and geared to the trailing axle of the guiding trucks in the same way as the ordinary street-car motor. They are used for generating current for the excitation of the fields of the main motors during operation, and they are the source of power for the auxiliary motors used in driving the compressors and blowers.

These generators are regulated for a normal voltage of 100 during the period that they are furnishing current for the auxiliary motors. During the period of regeneration the voltage of the machine varies from 25 to 100 volts.

The generator fields are excited from a storage-battery circuit and the voltage is controlled by a power-operated rheostat automatically controlled during the

time the machine furnishes current for the auxiliary motors, and manually controlled by the engineer during the time when the locomotive is regenerating.

It is possible to control a train on a down grade with the power off the line, since these axle-driven generators, separately excited from a storage battery, will furnish current to drive the compressor motors, which furnish the air for the brakes. Due to the heavy grades over which the locomotives have to operate, this is regarded by the railway company as one of the important characteristics of the axle generator. The fact that the auxiliary apparatus on the locomotive is operated at low voltage, which is practically independent of the line current, is also a great advantage.

Causes of Two Accidents

Interstate Commerce Commission Analyzes Reasons in Last Accident Bulletin—Attention Is Called to Disregard for Operating Rules

AT A TIME like this when many new men are being added to their forces by all electric railways, special attention should be given to the prevention of accidents which are caused by disregard of operating rules.

The last report on accidents of the Interstate Commerce Commission gives accounts of two collisions on electric railways last summer. One of these was on the Washington, Baltimore & Annapolis Electric Railway on Sept. 2, the other on the Shore Line Electric Railway in Connecticut on Aug. 13. Both were serious as regards the number of persons injured.

The accident first mentioned was a rear-end collision during a fog, the trains being operated on the train order and time-table system. The report says that the direct cause of the accident was that the crew of the following car did not operate their train under control as required by rule, and a contributing cause was the failure of the conductor on the forward car to provide protection for the rear end of the car, when operating at reduced speed. The commission calls attention to the ineffectiveness of a rule requiring trains in the same direction to keep 1 mile apart when the motorman of the following car has no means of determining the location of the car ahead. The commission also speaks of the protection offered by block signals and the importance of having special rules printed on the time-table or incorporated in a printed book rather than to post them in the form of bulletins in the trainmaster's office.

In the case of the Shore Line Electric Railway, the report says that train movements were governed over this single-track line by schedule and dispatcher's orders and regular trains were run on an hourly schedule, but this schedule was not printed—simply written and posted at the various terminals. The schedules for extra trains also were not printed but written out as occasion required and placed on the bulletin board or attached to the regular schedule as a supplement. The direct cause of the accident, according to the report, was the failure of a motorman and conductor of an extra train running west to wait at a turn-out for the arrival of an opposing train, as required by the running schedule of their trains. The motorman on the extra gave no definite explanation of why he failed to stop at

the proper turn-out but said that he was not paying attention and thought he was on a regular train, the schedule of which called for no meet at that point. The conductor seems to have been asleep when the car passed the turn-out at which it should have stopped. The commission criticises the discipline in vogue at the time of the accident and calls attention to the absence of mechanical safeguards for accident prevention.

A-Z-U-R-I-D-E Riding Well

SINCE mid-February the public relations department of the Los Angeles Railway has been issuing fortnightly a cheery car folder entitled *A-Z-U-R-I-D-E*, with the sub-title "Facts about Street Car Service and Thoughts by the Trolley Philosopher." The philosopher in question is George Baker Anderson, who is putting a lot of zest in the work. Wherever possible the message of the railway is put over indirectly in the form of a story, as in the soliloquy of Iva Strong Huntsch on his failure to use the Safety Zone; on the passenger ahead who fumbled for change; of the passenger who also delays cars by failing to pick up his bundles in time, etc. Other pamphlets describe the rush hour, the late-shopper trouble, the woman who

A-Z-U-R-I-D-E


FACTS ABOUT STREET CAR SERVICE
and thoughts by the trolley philosopher

SHOULD BE KEPT EVERY OTHER THURSDAY BY THE PUBLIC
RELATIONS DEPARTMENT, LOS ANGELES RAILWAY
NO. 1 NO. 4

WHEN THINGS GO WRONG

WE DON'T look upon ourselves as belonging in some realm where all is perfection. We are human, and therefore something may go wrong on the streetcar service without being brought to our notice in spite of our most diligent efforts and the vigilance of our large force of inspectors, dispatchers and others of the operating force who are constantly on the lookout for defects and striving strenuously to remedy them with the least possible delay.

Complaints regarding any aspect of the service that patrons do be reasonable and welcomed at all times—whether they be finally found justified by the facts or not. If your complaint is justified, you will have



REPORT OF THE BOARD OF
A COMPLAINTS HAS
patrons do be reasonable and welcomed at all
times—whether they be finally found justified by
the facts or not.
If your complaint is justified, you will have


too, with possible readjustment of hours of travel, even or some personal sacrifice. Those who can should arrange to travel during the hours of normal traffic, and avoid adding to the necessary congestion during the so-called Rush Hours.

The unprecedented undertaking of this nation means more than that huge armies of men must fight on the battlefields of Europe. It means that every available resource must contribute its part toward that end. It means that the men in the trenches must have the unstinted support of the nation's wealth and energy.

Waste is a smooth pavement for the road to Destruction—waste of land or fuel, of materials that enter into electric railway construction and operation, or of Man-power.

THE PORKER

He always seeks the corner of the long seat on the ends,
And liberally bestows himself for comfort on his ride.
He spreads his legs, and puts an arm upon the window sill,
And for some time across two seats
While riding up the hill.
Momentary while I am standing on the aisle, I'm filled with bliss
To see that selfish fellow with his legs uncut out



TYPICAL PAGES FROM A RECENT ISSUE OF *A-Z-U-R-I-D-E*

gets off backward, the avoidable accident, etc. A particularly good feature is the use of diagrams to show how certain accidents occur in running after a moving car or getting away from one to be caught by another.

In addition to the pamphlets, service advertisements, accident warnings, etc., are also run in the newspapers. These announcements explain some rerouting. A particularly clever advertisement on safety was headed:

The ESS Sense of Safety

Slow	vs. Swift
Security	vs. Surgeon
Sanity	vs. Suicide
Safety	vs. Sorrow

Many commendatory letters and very few complaining ones have been received, indicating that the public is not averse to getting the facts.

Why Not Use Wasted Energy to Help Heat Cars?

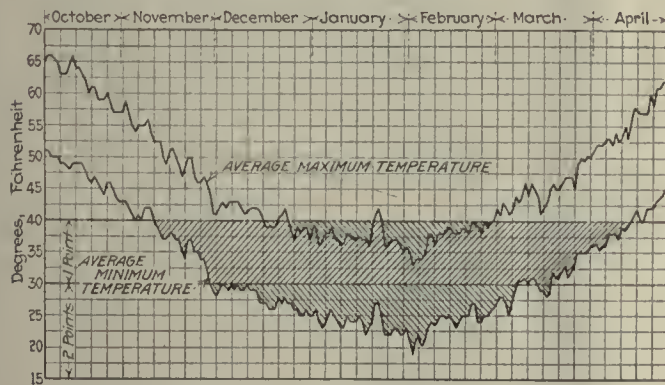
The Possibilities of Utilizing the Heat from Car Motors and Resistance Grids Are Discussed and the Results of some Tests Are Given

IN EXTREMELY cold weather the energy used to heat a car may amount to from one-quarter to one-third of that required to propel it. By a coincidence, this is about the quantity which is dissipated in the core and copper losses of the motors and in the resistance grids of a car in ordinary city service. The utilization of this energy for heating a car has been frequently suggested as a possible economy in car operation but the idea has never been adopted, principally, as we understand it, due to the following reasons: (1) This heat is generated spasmodically and is not readily subjected to control or regulation. (2) Heat is generated only while the car is being propelled, so that some other means to assist in heating is necessary. (3) There is danger of an offensive odor if this heated air is admitted directly to the car body. (4) The additional cost and complication involved in such an installation might offset the economy expected.

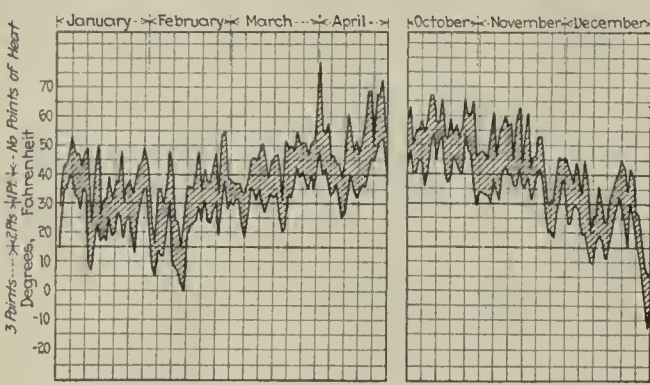
Several railway companies have conducted some very extensive tests to determine the amount of heat ob-

and third cases the resistors were mounted under the car and inclosed in a sheet-iron box lined with asbestos. The heat was conducted to the inside of the car through ducts. In one of these two cars the circulation of heat was accelerated by the use of a blower and in the other no artificial means of circulation was employed.

These results indicate that the total heat available from the resistors will give about the same rise in temperature inside the car as two points of heat from the heaters. Without forced circulation of air approximately one-half of this is lost in conducting it to the car. When the hot air is circulated by means of a blower a slightly greater amount of heat is obtained for heating but probably not enough more to pay for the extra expense of installing and maintaining the blower. The cost of boxing-in the resistors and making the necessary connections to the inside of the car varies from \$35 to \$50 per car, and where a blower is used it is about \$100 per car. The box inclosing the resistors should be arranged to be opened during the



AVERAGE TEMPERATURES DURING WINTER MONTHS FOR FORTY YEARS IN NEW YORK CITY



TEMPERATURE RANGE DURING WINTER MONTHS OF 1917 IN NEW YORK CITY

tainable from the resistance grids. The results vary widely with the service and with different motormen operating the cars, as would be expected. Table I shows some of these results, selected as representing the average from the test data available. These particular tests were made with wooden elevated cars 47 ft. long by 8 ft. 7 in. wide. The cars were operated in regular passenger service and comparisons are made for cars in the same train.

This table gives results of heating with electric heaters with one and two points of heat, and taking 8 amp. and 16 amp. respectively, and also the results of heating the cars by means of the grid resistors. Three different arrangements for heating by means of the resistors were tested. In one case the resistors were mounted inside the car so that all heat generated would be used for heating. No passengers were carried in this car but the doors were opened and closed at each stop as in regular operation. In the second

season when no heat is required and closed off from the car body. On one road making such a test the resistors were kept in service with the box closed during the summer months and no evil results were experienced from overheated resistors.

The results from these tests indicate that heat equivalent to that obtained from approximately 4800 watts with electric heaters can be obtained from the resistors. This is equivalent to one point of heat, or about one-third the amount usually available for heating when heaters are used. It would be necessary to supplement such a system with electric heaters to provide this necessary capacity, and to provide for heating the cars while standing or previous to entering service. In order to obtain satisfactory results the heaters should be automatically controlled with thermostatic regulation. In all of the tests conducted there was no noticeable offensive odor.

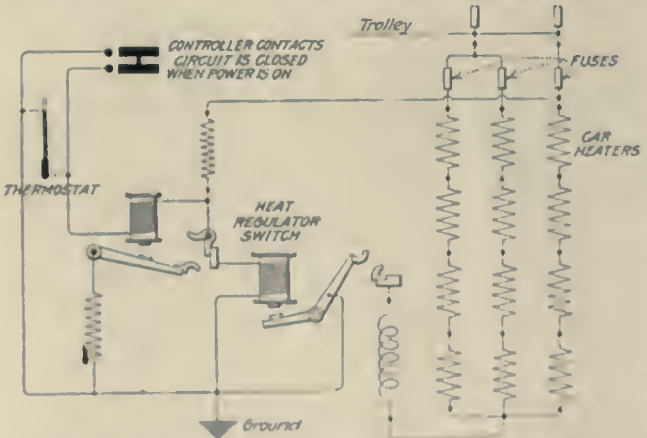
Efforts of the designers of control apparatus have

always been directed toward producing resistors that will run cool. If new equipment was designed with an idea of using the heat available from the resistors better heating results could doubtless be obtained.

In New York City the usual practice is to turn on one point of heat when the outside temperature falls to 40 deg. Fahr., two points when 30 deg. Fahr. is reached and three points for temperatures below 15 deg. Fahr. In order to indicate the relative amount of time that each degree of heating is required in one locality, graphs have been plotted of the average maximum and minimum temperatures during the winter season for New York City during the past forty years. In extending the average values over such a long period the high and low points are smoothed out but average conditions are indicated.

It is seen from these graphs that, if average conditions always obtained, two points of heat would meet most of the requirements, as the lowest average temperature is but 19 deg. Fahr. The heating season extends from Nov. 1 to the middle of April. Between Dec. 1 and the first week in March there would be periods when two points of heat are necessary.

Similar graphs for the maximum and minimum temperatures during the winter months of 1917 are also shown. These indicate that there were 168 days during the year with temperatures of 40 deg. Fahr. and below. During portions of twenty-four days three points of heat were required, two points for portions of sixty-seven days and but one point for portions of seventy-seven days. It is also seen that during the three winter months of December, January and February there were thirty days out of the total of



CONNECTIONS FOR INTERLOCKING HEATER CONTROL WITH CAR CONTROL

ninety on which temperatures above 40 deg. were recorded, when no heat was required. The full capacity of the heater equipment installed is thus required but a small percentage of the time in this climate.

Some tests have been made to determine the practicability of utilizing the heat from the main motors for car heating, but the results so far obtained indicate that the cost of the necessary air connection to the motors is high and that the hot air itself must be prevented from entering the car due to liability of offensive odor. In all-steel car construction there is a type of floor used with air space to provide heat insulation. The hot air from the motors could be led through this space and so aid in heating the floor without allowing the air to enter the car.

TABLE I—COMPARISON OF HEAT PRODUCED BY RESISTORS AND HEATERS IN CARS WITH SAME SERVICE

		Average Outside Air, Deg. Fahr.	Average Inside Air, Deg. Fahr.	Average Rise, Deg. Fahr.
Three cars in same train.	Car heated by heaters, 16 amp., 600 volts.....	39.2	53.5	14.3
Elevated passenger service.....	Car heated by resistors under car; no blower.....	39.2	46.2	7.0
	Car heated by resistors inside car.....	39.2	54.2	15.0
	Car heated by heaters, 16 amp., 600 volts.....	34.7	47	12.3
Three cars in same train...	Car heated by heaters, 16 amp., 600 volts.....	34.7	47	12.3
Elevated passenger service.....	Car heated by resistors under car; no blower.....	34.7	40.4	5.7
	Car heated by resistors inside car.....	34.7	48.3	13.6
	Car heated by heaters, 16 amp., 600 volts.....	45.9	60.3	14.4
Two cars in same train....	Car heated by heaters, 16 amp., 600 volts.....	45.9	60.3	14.4
Elevated passenger service.....	Car heated by resistors under car; air circulated by blower, two intakes, two outlets....	45.9	55.8	9.9
	Car heated by heaters, 16 amp., 600 volts.....	35.2	48.5	13.3
	Car heated by heaters, 8 amp., 600 volts.....	35.2	43.5	8.3
Three cars in same train...	Car heated by resistors under car; one intake, one outlet...	35.2	42.2	7
	Car heated by heaters, 16 amp., 600 volts.....	33	54	21
	Car heated by heaters, 8 amp., 600 volts.....	33	47	14
Elevated passenger service.....	Car heated by resistors under car; air circulated by blower, one intake, two outlets.....	33	50.3	17.3

During the past winter, owing to the difficulty in obtaining coal, many electric railways cut off the heat entirely from their cars during the rush-hour peaks. The heating current load occurs exclusively in winter when both the power and lighting loads are at their maximum and the top of the peak costs most. With an idea of smoothing out these peaks the Interborough Rapid Transit Company has conducted some tests on car heating by having the heater circuit interlocked with the control connections so that heat will be on only when power for operating the car is off. As already pointed out, in this particular climate the full capacity of the heater equipment is seldom required, and by using this method the reserve capacity of the heater equipment can be turned to good advantage. An accompanying illustration shows a diagram for connecting a standard heat regulator with thermostatic control so that this interlocking is accomplished. With connections made as indicated heating current will be used only when power is not being used for operating the car and then only when the inside car temperature is below that at which heat would be cut off by the thermostat. Where thermostatic regulation is not desired the thermostat with the dotted connections can be omitted.

A comparative test made with the heater connection interlocked as described gave the following results:

Outside temperature.....	12 deg. Fahr.
Car temperature (heat on when power for operation is off)....	40.9 deg. Fahr.
Car temperature with two circuits of heaters on continuously..	49 deg. Fahr.

It is thus seen that the average temperature obtained inside the car with such an arrangement for heating was sufficient when the outside temperature was as low as 12 deg. Fahr.

The advantages of this method of interlocking the heater circuits with the car control lie in its ability to smooth out the peaks, for manifestly, if cars are heated to the same temperature in the two cases, the same amount of power will be used.

The GE-258 Motor in the Shop

The Writer Describes the Overhauling Methods Used and the Resulting Cost, Together with Some Operating Troubles Experienced

BY WALTER FINK

Master Mechanic, Austin (Tex.) Street Railway

FOR a small railway there are many advantages in using the safety car, not the least of which is the ease of handling and maintaining the smaller and more efficient motors that go with it. We are now operating seven safety cars, all of which are equipped with GE-258

motors. The simplicity of handling this motor may be judged from the accompanying illustrations, one of which shows how the armature is lifted out of the frame by means of a Franklin portable crane. The second illustration shows the armature and motor frame set up for inspection in positions which make accessible all parts of the frame, coils, wiring and brushholders.

The armature is shown resting

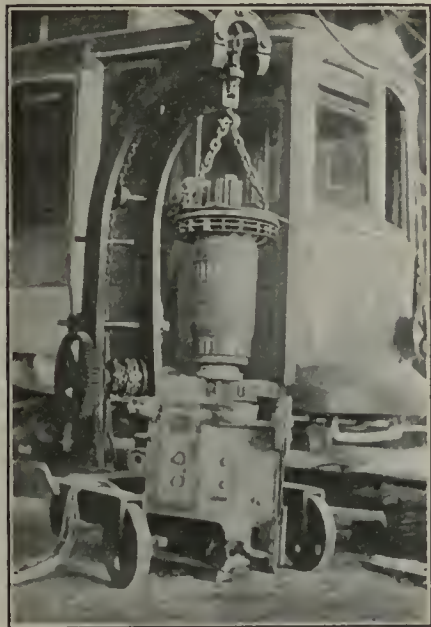
in a simple block. With the armature in this position, the pinion and ball bearings can be readily removed and replaced.

We remove the motors from the truck by means of a chain block fastened over the trap door of the car. The motors are lowered into the pit after removing the axle bearings and gear case, and then lifted onto the floor of the shop for inspection as shown in the illustrations. This operation might be simplified by means of a suitable pit jack.

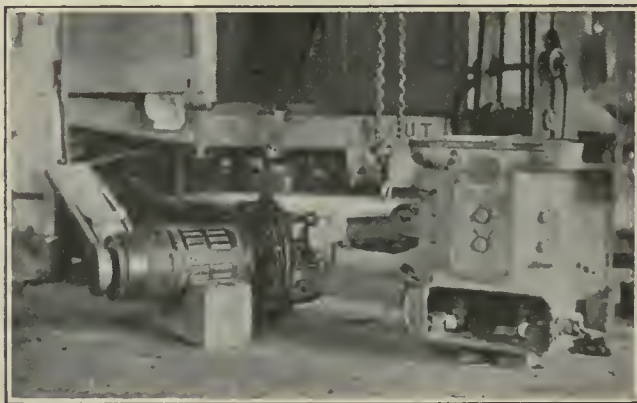
The average cost of a recent inspection of our two-motor equipments was \$6.90 per car. The cost covered the work of removing and replacing the motors on the truck, removing and replacing the pinion and ball bearings, and thoroughly washing the latter in gasoline. We endeavor to give our motors an inspection every six months, in order to watch the service they are giving. However, it should not be necessary to inspect them oftener than once a year.

Operating troubles of this motor have proved gratifyingly small. Owing to the small clearance of the motor above the paving, holes were knocked or worn in the gear case, with the consequent intrusion of sand and grit. This condition, of course, is simply a question of better paving or a larger diameter car wheel. The earlier design of the GE-258 motor as used by us was also subject to loosening of the retaining collar which

holds the pinion-end bearing. The collar was screwed on and held in place by means of a locking spring. Sometimes the pin of the locking spring broke and fell out, allowing the collar to unscrew. While the pinion prevented the collar from unscrewing entirely the ball bearing would get loose and be subject to accident. Both ourselves and the maker have cured this defect by



LIFTING AN ARMATURE OUT OF A BOX FRAME MOTOR BY USING A PORTABLE CRANE



ARMATURE SUPPORTED BY BLOCK AFFORDS EASY ACCESS FOR INSPECTION

shrinking instead of screwing the retaining collar onto the shaft.

We have not had to rewind a single armature. The first pinion was not removed from these motors until it had given 100,000 miles wear, or three times the wear with older motors on our property. Our experiences in studying the wear of the ball bearings of these motors will be considered in another article.

Lifting Magnets Aid in Loading Cars

A LIFTING magnet conforming in general to the accepted standards of construction but with several improvements has been placed on the market by the Ohio Electric & Controller Company. The height of the magnet is but slightly more than 8 in. and the parts are bolted together with heavy chrome-vanadium steel studs having nuts on top of the case. These nuts are protected by ribs raised from the outer rim, and heat



LOADING SCRAP MATERIAL WITH A MILL-TYPE LIFTING MAGNET

radiating ribs have also been added to the top and bottom. The wires leading to the coil have been securely anchored to the case to prevent them being pulled loose and grounded and they are also provided with flexible protecting armor. The connections are welded directly to the coil. Asbestos insulation is used throughout.

Emergency Auto-Ladder Truck Used in San Francisco

Provision Is Made for Carrying All Necessary
Tools and Equipment as Well as a Crew
of Ten Men

By S. L. FOSTER

Chief Electrician United Railroads of San Francisco

WHILE the use of a hinged ladder on a roofed vehicle for emergency line repairs on electric railroads is not new, the details of its application by the United Railroads of San Francisco may be interesting.

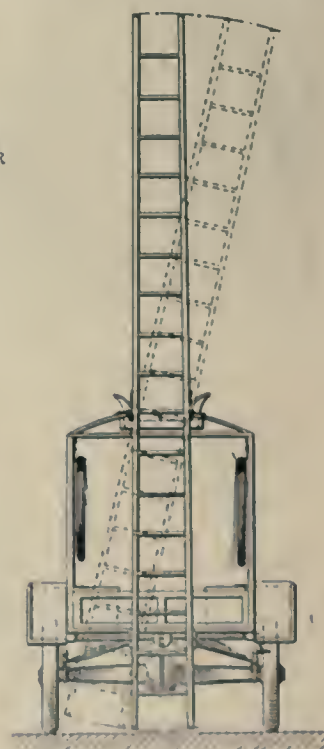
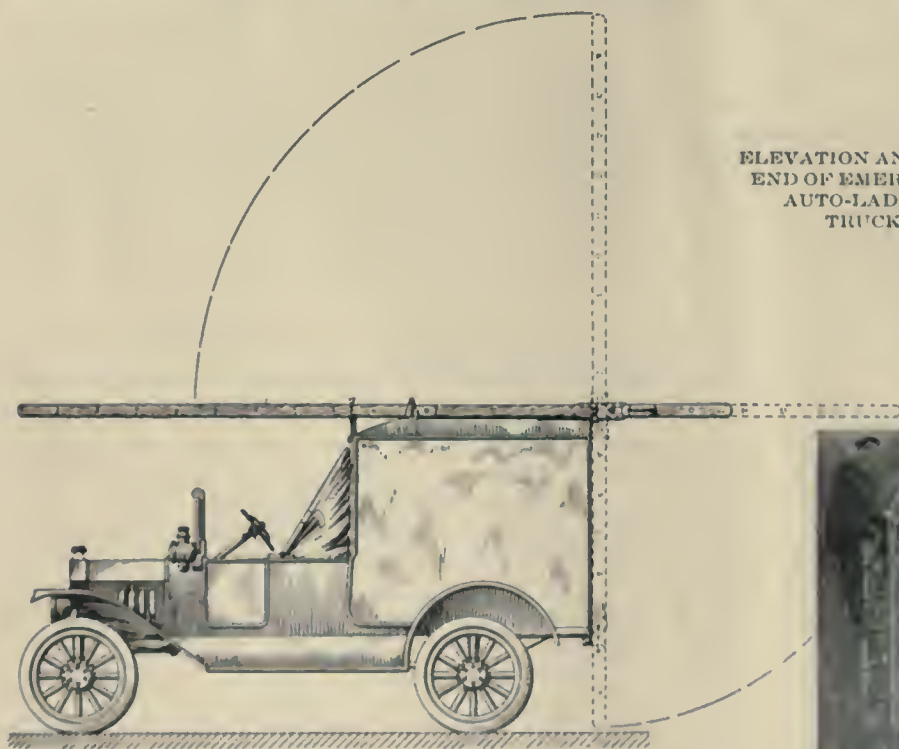
The accompanying illustrations tell the story. The chassis is a six-cylinder Haynes with pneumatic tires. The vehicle was otherwise built in the company's shops.

When on the way to the job the ladder lies flat on the roof with one end flush with the front of the headlights and the other extending slightly over the rear. There is thus little or no danger of this projecting ladder striking other vehicles. The ladder is held firmly in this position both on top and on the sides by a pair of hinged

spring hooks until it is desired to raise it to the erect position. Then both hooks are pulled apart by the chauffeur and the ladder is pushed up above them. At the same time the ladder is pushed backward until a pin on either side engages the jaws of the hinges on the rear end of the roof. The parts of the ladder are then so nearly balanced on either side of the hinge that it is readily raised to an erect position by a slight pull on the projecting rear end, and is fastened by a movable latch on the body of the truck below the floor level. If the work to be reached is directly overhead the workman can at once climb the ladder. If the work is located to one side of the center of the truck and at a point inaccessible with the ladder erect, the ladder can be thrown over at an angle to reach beyond the side of the car by means of a worm attached to the latch actuated by the crank seen at the rear of the truck in the illustration with the ladder erect. This is also shown in outline drawing of this truck. The top of the ladder is provided with an iron strap permitting a short extension to be added to it if additional height is needed.

The vehicle is roofed over and provided with side

ELEVATION AND REAR
END OF EMERGENCY
AUTO-LADDER
TRUCK



EMERGENCY AUTO-LADDER TRUCK READY
FOR SERVICE



EMERGENCY AUTO-LADDER TRUCK
WITH LADDER RAISED

storm curtains for use in rainy weather. The "Auxiliary Fire Apparatus" sign, the portable fire extinguisher and the siren secure for it a clear path on the streets and the Haynes six-cylinder equipment provides ample speed to reach the scene of trouble promptly. Forty miles per hour is often exceeded on outside boulevards. The ladder can be raised in five seconds after the auto stops.

In lowering the ladder, it readily drops in between the large hooks and is drawn ahead until the catches on the sides slip behind the hooks as the auto pulls out of the track. These features can be more readily noted in the accompanying illustrations.

This emergency outfit is provided with the usual equipment of ropes, blocks, come-alongs, splicers, tools and materials for making repairs to the overhead wires, electric track switching devices, block signals, sectionalizing switches, lamp clusters, etc. Its long body furnishes ample room for transporting a crew of ten men, the tool and material bins serving for seats. The space between bins is ample for carrying tools for digging, and for raising, moving and straightening poles, and stretchers or extension ladders as the exigencies of the case may require.

The truck is also provided with a drawhead in the rear whereby light vehicles like a trolley-wire two-wheeled gig or a light derrick wagon or ornament-hoisting wagon can be towed to the scene of the trouble.

The truck has an electric self-starter, electric head and tail lights and a speedometer, a spotlight in front, a mirrorscope or safety mirror for watching the rear, and an extension ladder strapped to the ceiling of the roof. Two men usually respond to calls in this machine, although one man could handle most cases.

Shopwomen Doing Good Work in Quaker City

Female Workers in the Philadelphia Rapid Transit Shops Wash and Paint Cars, Wind Armatures, Run Drill Presses, etc.

LIKE all of the other established industries located in munition manufacturing, shipbuilding or other war industry districts, the Philadelphia Rapid Transit Company has been hard hit in the repair shops in the matter of labor. To replace the workers drawn away by the high wages offered in the manufacturing plants new workers have had to be employed. Hence, as about the only existing reserve in this line is female labor the introduction of the shopwoman on a considerable scale has been the result.

The Philadelphia Rapid Transit first began taking on women workers just before the holiday season of 1917. At first they were put at small-coil winding in the large Kensington Avenue and Cumberland Street shops of the company. These shops are not simply operating or maintenance shops, but are the main repair shops. The repairs made here are not of that class sometimes called "running repairs" but correspond rather to the "back shop" work of a steam railroad. To illustrate the variety of work in which the women are engaged, the following may be mentioned: One woman is engaged in the painting of destination and route signs and all other lettered or stencil notices which permit the

use of the ordinary paint stencil. Another varnishes the window sashes, shutters, doors and other light parts of the cars. The paint and oil spots are removed from the windows of the cars coming out of the paint shop by women workers. In the machine shop they are now operating drill presses and the company expects to put women workers on lathe and shaper work as soon as opportunity offers. In the winding department the greatest number of female workers are to be found. Practically all of the coil winding and taping is done by girls as well as a large amount of armature winding including the winding of armatures of the elevated car motors.

WOMEN EXCEL IN PREPARING CARS FOR THE PAINT SHOP

In one type of work, women workers seem particularly to excel. This is in scrubbing and cleaning car interiors preparatory to painting and varnishing. This kind of labor was always shunned by the men and it was difficult to employ men who would do this work in a satisfactory manner. Women, however, take to the work readily.

In all the work in which they have been tried out so far they have given satisfactory service, doing not only better work, but more of it than the men and boy workers formerly employed. About eighty-five women and girls are employed in the shops at present. Practically all the work is on a piece basis and conditions are very similar to those in a manufacturing plant. The working day is nine and three-quarter hours in length except Saturday on which it is five and one-quarter hours. Thus the weekly work time is fifty-four hours.

THE WORKING CONDITIONS ARE THE SAME AS FOR MEN

The women are paid the same rate as the men for similar classes of work and are in general put on the same working basis. Special facilities, of course, have been provided for them in the way of rest and wash rooms. A standard working uniform for the female worker has not been adopted, but suitable "all-over suits" costing \$1.50 are bought by the workers at local department stores. The piece rates at which they are paid would, in terms of hourly rates, range from 27 cents to 33 cents per hour. The workers, depending on their experience and the kind of work, make average weekly wages ranging from \$16 to \$22, while some of the more proficient, of course, exceed these averages. It is noticeable that the younger women prefer the winding and machine shop work, while the older ones, who would normally do scrubbing in hotels or office buildings, apply for the car cleaning work. So far the company has had no difficulty in getting women workers as fast as needed to fill gaps in the shop force.

The women are proving steady and willing workers, asking for "time off" no oftener than the men. They learn very quickly. Probably one of their greatest faults is the tendency to become discouraged if they do not master completely a new operation the first day they work on it. In general, however, their work has been very satisfactory and the company is gradually increasing both the number employed and the diversity of the employment. Time is kept by their signing "in" and "out" with the gateman at the shop entrance.

A Track Puller for Paved Streets

A Machine Used By the Los Angeles Railway Makes Rapid Removal of Tracks from Paved Streets Possible

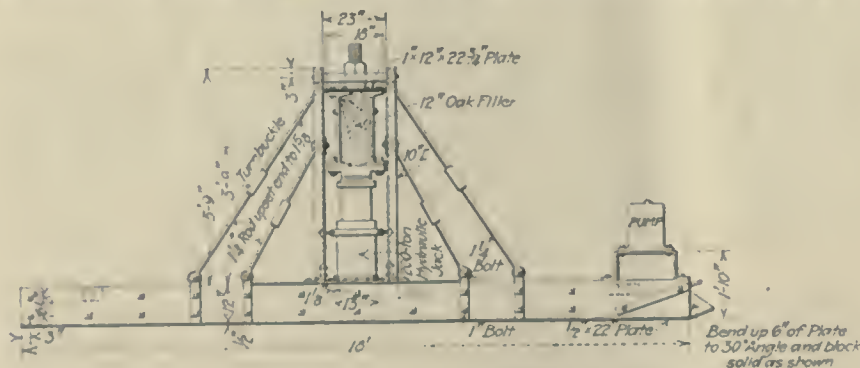
BY THOMAS W. BULPIN

Chief Engineer, Los Angeles Railway

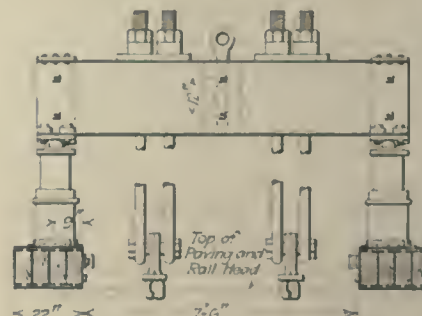
THE standard type of railway construction for paved streets for urban and interurban lines, usually consists of high groove or girder rail paved with cement concrete and often with a cement grouted base or ballast. The placing of these tracks in city streets is sufficiently difficult to tax the ingenuity of most construction men when present traffic and service condi-

straddle the track as shown in the accompanying illustrations. These beams prevent the breaking of the pavement outside of the railway strip. The rail tongs are made to fit the special section of rail upon which work is being done. Although our practice has shown that there can be considerable leeway in this regard, the jacks are placed directly under the beam from which the rail tongs are suspended.

The preliminary work necessary consists of cutting out sufficient paving along the rail to permit of the placing of the tongs under the ball of the rail. This must be done at intervals of 10 ft. to 20 ft., depending upon the construction of the track to be pulled. The jacks are started and a lift of from 6 in. to 9 in. is sufficient to



DETAILS OF TRACK PULLER



tions are considered, and the officials of the roads have been looking forward with real apprehension to the time when these same tracks must come out.

About eighteen months ago our company constructed approximately 700 ft. of double track in paved streets. The rail was P. S. Co. No. 292 section, 7 in. high and weighing 116 lb. to the yard. This rail was laid on 6-in. x 8-in. x 6-ft. redwood ties spaced 20-in. centers. These ties were placed on a 6-in. crushed rock, cement grouted ballast and the entire rail paved in with cement concrete, making a solid concrete pavement 19 in. in thickness. This particular portion of track was part

pull the rails entirely free from the ties and thoroughly break the concrete within the railway strip. This operation, including the moving of the machine, requires from four to six minutes.

The machine is moved along the track with an electrically operated Brown-Hoist crane, the operation consisting of raising the puller a few inches above the pavement and moving it entirely suspended to the next position.

We have found it desirable to follow immediately behind the machine with two 15-ton hand jacks, as this facilitates the removal of concrete and paving blocks.



FIG. 1—PULLER IN POSITION READY TO PULL TRACK. FIG. 2—CONDITION OF TRACKS AND PAVING AFTER PULLING THE TRACK. FIG. 3—HAND JACKS USED TO REMOVE BROKEN CONCRETE

of a line recently abandoned by the company, and under the abandonment proceedings was required to be removed within a time limit.

To remove these tracks the company designed and constructed a machine which consists of two 200-ton hydraulic jacks, mounted on horizontal beams which

As yet we have prepared no comparative estimates of cost, but we find that we are able to pull out about 120 lineal feet of track per hour. We have estimated that with this machine and six men, we can remove more track than we could with 200 men under the ordinary method of sledging and gadding.

Pacific Electric Adopts Flood-Control Measures

Shifting of Stream Beds Furnishes Difficult Problems for the Way Department of This California Company

BY CLIFFORD A. ELLIOTT

Cost Engineer, Maintenance of Way Department, Pacific Electric Railway, Los Angeles, Cal.

BETWEEN 1905 and 1910 the Pacific Electric Railway in southern California completed some of its most important double-track lines. These ran through localities where it was necessary to construct many pile trestle bridges across streams and in some instances across dry washes or old channels which are often flooded by the heavy spring rains.

The bridges were located as nearly as possible at right angles to the streams, as these flowed at the time of construction; in many cases, however, the shallow and sand-shifting beds have caused the main channels

to obtain in the open market second-hand steel spans which have proved too light for the latest type of heavy locomotives now in use on steam roads but which are desirable for interurban electric lines.

When altering the bridges in the manner outlined, the double track at each end of the bridge is connected by a switch layout for single-track operation, and an all-electric automatic block signal layout is installed for operating the single track over the bridge. Four signals in all are required for the operation of the single track over the bridge, one being a distant signal and one a home signal. Small back-up, two-position light signals are also placed. One set of signals controls operation from the inbound track onto the single track, while the other controls similar operation onto the outbound track.

This program of improvement in the interest of flood control, as initiated by the company some two years ago, is approved by various flood control and drainage committees, while the State Railroad Commission is favor-



SINGLE-TRACK TRESTLE WITH STEEL SPAN BRIDGE
ACROSS ARROYO SECO



SINGLE-TRACK STEEL BRIDGE UNDER CONSTRUCTION
ACROSS THE SANTA ANA RIVER

to change from season to season. The flood control boards and the various county engineers are now endeavoring to remedy this situation.

Frequently six to eight bridge bents have been damaged or carried away by the uncontrollable flood waters, and in one or two instances that portion of the double-track pile trestle nearest the stream has been entirely carried away. This necessitates temporary repairs being made immediately to keep the bridge in safe condition for operation until permanent repairs or reconstruction can be undertaken.

In reconstructing these bridges the timber structure is replaced with steel-span type where possible. In the interest of economical reconstruction, and to minimize future maintenance expense, either the outbound or inbound double-track trestle is sometimes abandoned, depending upon which trestle is most in need of general repairs, and only a single-track bridge is left over the stream. In such reconstruction, steel spans are placed over the main channel only, the balance of the structure being reconstructed as a timber trestle. At the same time it is strengthened to provide for handling the increased heavy freight and passenger traffic and the increased weight of added equipment.

The average length of such steel spans is from 50 to 100 ft., and they are placed either on concrete footings, concrete piers or steel supports. Usually two or three steel spans will clear the average channel. Where practicable, and in the interest of economy, efforts are made

able to such steps as the company has taken to protect the interests of the outsider as well as that of the company.

The accompanying illustrations show new steel bridges recently installed in reconstruction work on the company's lines. One spans the Arroyo Seco on the South Pasadena line near the famous Cawston Ostrich Farm. This bridge, as reconstructed, is 761 ft. long and 40 ft. high, and consists of 593 ft. of single-track standard frame trestle, two 60-ft. deck-plate steel girder spans, and two 24-ft. deck-plate girders on steel towers, a total of 168 ft. of single-track steel span structure. One view shows a steel bridge on the company's San Bernardino-Redlands line, spanning the Santa Ana River. Three 100-ft. single-track combination truss spans on cylinder piers were replaced with three common standard 100-ft. single-track pin-connected truss spans on concrete piers.

As mentioned in a recent issue of *Revue Générale de l'Electricité*, the Swiss Association of Electricians has appointed a committee to study, in conjunction with the Swiss Society for the Gas and Water Industries and the Union of Secondary Railway Lines, the subject of electrolytic corrosion of underground conductors by return currents. The association has just approved two reports from its general secretary, one on the present status of the corrosion question, the other on some cases of corrosion in Switzerland.

More Than Recommendation Needed

Frank Putnam, of Milwaukee, in Open Letter to Messrs. Elmquist and Eastman, Urges Federal Action Rather Than Suggestion

FRANK PUTNAM, of the Milwaukee Electric Railway & Light Company, has addressed an open letter to Charles E. Elmquist, president National Association of Railway & Utility Commissioners, and to Joseph B. Eastman, chairman of the special war committee of the association. The subject of Mr. Putnam's letter is the communication which these gentlemen sent to the President under date of July 30 and mentioned on page 208 of the issue of this paper for Aug. 3, urging the appointment of a federal administrator with "power of recommendation, advice or request to the state and municipal authorities" on electric railway rates. Mr. Putnam's letter follows:

I have read a copy of your letter, addressed to the President, suggesting the appointment of a National Administrator, or board of three, "with power of recommendation, advice or request to the state and municipal authorities," as a means of establishing, for the period of the war, street and electric railway rates adequate to assure continued and efficient operation of these railways.

It is apparent to me, as a close student of the American street railway business for several years past, that your letter to the President fails to present to him certain facts which he and others who may have to deal with your proposition should know. In order to get these missing facts to the President and his advisers, and in order to give you opportunity to answer any statements I shall make, I write this open letter to you, sending copies to the President and to others by whom he may be guided, and to the press.

The facts to which I call particular attention are these:

First: The street railway business in the United States, as a whole, is at the verge of bankruptcy. This fact has been painfully apparent to men engaged in the business during the past two years, although many members of the state public service commissions have been slow to see it. It is brilliantly and truthfully made known to the general public for the first time in an article published in the current number of *Collier's Weekly*.

Second: The street railway business of the United States is in this condition chiefly because state and municipal regulation has strangled it by fixing fares too low to permit the business either to pay good wages, or to supply adequate good service, keeping pace with increasing public requirements, or to pay investors a fair return on their savings engaged in the industry.

Third: Your proposition that the suggested National Administrator, or board of three, should be given only advisory powers, and that war relief of revenue for street and electric railways shall remain as now subject to determination by state and municipal authorities, affords no guaranty that these railways will get the relief they desperately need and which public welfare requires that they shall obtain, in time to make them more efficient contributors to the nation's war program, or to save their investors from further vast, unmerited losses. Your suggestion that the National Administrator's requests for relief of street and electric railways during the war would be "almost uniformly" granted by state and municipal authorities must be measured against the last ten years' record of state and municipal authorities. What is that record? They have imposed rate and service limitations which have brought the industry to the verge of bankruptcy. They have condemned street railway employees to low wages and long hours. They have subjected street railway investors to the unjust loss of millions of dollars legitimately invested to serve the public. They have compelled the public to put up with service which in kind and quantity was and is grossly inadequate to public needs.

Your statement that the state commissions "have with few exceptions acted favorably upon meritorious applications for rate increases for the war period"; that the state commissions are "keenly alive to the emergency which confronts these utilities, and have proved a readiness to act promptly in giving necessary relief"; and your expressed opinion that "no joint complaint could be made, by utilities or others, as to the action taken by state commissions in dealing with these matters during the war" is, I must believe, a sincere expression of your belief. I must add, however, that it challenges squarely the judgment of ninety-

nine of every 100 men actively engaged in the street and electric railway business during the war period.

Fourth: Your suggestion that the National Administrator should depend upon the state commissions "for all purposes of inquiry, investigation, ascertainment and report of facts, and co-operation in recommendations" for revenue relief, and that the granting or withholding of such relief should continue to be as now at the option of the state commissions, impresses me as being substantially a proposition to leave the whole issue of relief in the hands of the local agencies whose policies during the past ten years have chiefly created the present alarming condition.

Fifth: It is the firm conviction of the ablest and most public-spirited men in the street railway business that if revenue relief under war conditions is to reach this business in time to make it a fully efficient factor in winning the war, such relief must be granted by the federal government under its general war powers. And these men believe that if the federal government assumes to act in the premises at all, it should prepare to act with the promptness and authority requisite to save the industry from further imminent loss of efficiency and from further ruinous depreciation of its plant and business values.

Sixth: Your contention that street railway fares fixed in franchise ordinances enacted years ago and now inadequate, should not be changed to save the solvency and efficiency of the street railways, except after "the merits and equities of the particular situation" have been "weighed and determined by those most competent to know of them and to deal with them," impresses me as being substantially an argument that the federal government shall waive the nation's war need for efficient street railway service and shall stand aside helplessly while the local street railway baiters proceed with their hitherto politically profitable occupation, and while fee-hungry lawyers continue to involve the whole subject in money, time and service-wasting technicalities.

Your assumption that street railway franchises are "often priceless" amazes me, in view of the fact that the state commissions were created to squeeze all "franchise values" out of street railway rates and revenues and have done it most thoroughly. You must be aware, although you seem for the moment to have forgotten it, that street railway franchises—otherwise than as permits to engage in business for stated or indeterminate periods (and to do so under state and municipal regulation of rates, earnings, service accounting, capitalization, etc.)—have for years past possessed neither earning nor sale value to the street railway companies. Indeed, most of the franchises, because of the costly requirements which they impose upon the companies, are now listed not as "priceless" assets, but as grim liabilities.

In the large majority of the states whose public service commissions regulate the issuance and sale of street railway securities, none, as you are aware, can be issued upon franchise values. Securities issued upon franchise values in the years prior to state regulation, when such values were legitimately sold by cities and legitimately bought by companies, have with few if any exceptions been disregarded by state commissions in appraising the values upon which the companies are permitted to entertain the hope, in recent years illusory, of earning a fair yearly net income. It has happened, as you must know, that in some instances companies which purchased franchises then believed to possess large value, and which companies during subsequent years paid millions of dollars of franchise-value taxes (over and above their fair share of property and business taxes), suffered the confiscation of such franchise values without a penny of compensation, in the laws creating the state commissions.

I as strongly as any man oppose the unnecessary extension of federal authority over new areas of American business. I as strongly as any man believe in the theory of local self-government and in the local regulation of businesses which partake of a public character. I almost alone among street railway men believe that in times of peace the adoption by street railways of a vigorous merchandising policy would quickly silence professional agitators against the business and procure just treatment from state and municipal authorities. I have that firm faith in the American public's instinct for fair play and in the power of an aroused public opinion to enforce justice.

But we are at war, and in the words of the late President Cleveland, "It is a condition and not a theory which confronts us" in the street railway business of the United States. The condition is so grave, both financially and industrially, that it is an appreciable menace to the nation's war efficiency. It is a condition which the leaders of the industry believe can be effectively remedied only by prompt and forceful federal intervention. These men see no hope in your proposal to refer this condition back for treatment by the agencies which produced it.

There may be some question as to the federal government's legal right so to intervene. There is no question, in the minds of men best qualified to offer counsel, as to the federal government's power and its duty to intervene.

Finally—and you must pardon me for writing with entire candor—I am impressed with the probability that your want of such complete and exact knowledge of street railway needs as can be obtained only by sharing the labors and responsibilities of the business, together with a not unnatural desire on your part to retain the prerogatives and perquisites of your official positions, has perhaps led you to underrate the importance of making the street railway systems of the country fully efficient for war service and to overrate the importance of retaining in public control of the business those state and municipal agencies whose narrow, unbusinesslike, illiberal and too often politically-motivated policies are chiefly responsible for the present street railway crisis.

Mr. McAdoo Denies that Government Plans Railroad Electrification

IN AN INTERVIEW which Mr. McAdoo gave to the daily newspaper men on Aug. 12, following his two months absence from Washington, he was quoted in some of the papers as suggesting that probably electrification would be actually undertaken while the government has control of the railroads and that the problem would be attacked at the most favorable points in the country where the static value of unused water powers was most obvious and the cost of changing from steam to electricity was comparatively slight.

When this statement was called to the attention of Mr. McAdoo by the Washington correspondent of the *ELECTRIC RAILWAY JOURNAL*, it was stated that while Mr. McAdoo had briefly discussed the conservation possibilities of unused water powers with the newspaper men and the use of such power for railway operation, he had not forecast the possibilities of such electrification while the railroads were under government control.

Railway Restaurant Opened at Fort Worth

TO CONSERVE the health of its men and to save them money in these days of skyrocket prices, the Northern Texas Traction Company, Fort Worth, Tex., opened a high-grade restaurant near its East Front car-



ATTRACTIVE INTERIOR OF NEW FORT WORTH RESTAURANT

house. The fittings are extremely durable, neat and handsome. The counters are topped with marble, and the twenty-eight stools are finished in porcelain. It is planned to sell to the men at discount, while outsiders who wish to do so can use the restaurant by paying full prices. The cost of outfitting totaled \$3,000.

Mitigating Inductive Interference

Leading Telephone Engineer Summarizes the Situation With Respect to Communication Disturbances Caused by Alternating Current Railways

IN A comprehensive paper read before the Philadelphia section of the American Institute of Electrical Engineers, H. S. Warren, electrical engineer American Telephone & Telegraph Company, gave details of the measures which have been taken on all of the principal railroad electrifications to minimize interference with telephone and telegraph communication. The paper has now been published by the Institute.

After outlining the fundamental principles by virtue of which interference with communication of circuits is caused, Mr. Warren said that alternating-current electrifications cause disturbances principally by electro-magnetic induction. The reasons for these disturbances are: (1) The railroad trolley current is large; (2) it is all residual current, and (3) the railway circuit from its nature and use is more subject to abnormal conditions, such as short-circuits, than ordinary power transmission lines.

Some of the ways in which disturbances manifest themselves in the telephone and telegraph plant may be classified as follows: (1) Interference with operation, such as interruption of service, false bell ringing, noise and interference with telegraph signals. (2) Physical injury to plant involving fire hazard and magnetization of loading coils. (3) Hazard to employees and to telephone using public including danger of electric shock and acoustic shock.

Among precautionary measures on the part of the communication companies are: Avoidance of "parallels," use of neutralizing transformers and drainage coils, sectionalization of telephone circuit, use of shielding conductor, resonant circuits and relay sets, balancing and insulation of telephone circuits and "biasing" of bells. The railway companies have used the double trolley, frequent power supply stations, sectionalization of trolley system, opposing polarities, application of balancing and booster transformers, etc.

After giving specific instances of the situation on the New York, New Haven & Hartford Railroad, the Norfolk & Western Railway and the Pennsylvania Railroad (Philadelphia-Paoli line), Mr. Warren gave these conclusions: Wherever alternating railway current can be kept sufficiently within control, except under abnormal conditions, means are now known whereby substantial interference with neighboring communication lines can be avoided, although the application of such means to the extent necessary may involve considerable expense. Even under abnormal conditions the interference can be greatly reduced by the application of suitable measures, but in some cases there still remains the problem of obtaining a sufficient reduction without incurring excessive cost. It is important in each electrification project that the railroad company and the communication company co-operate in determining what interference preventive measures shall be adopted. Each electrification requires a special study, as the best measures may be different in different cases. Railroad companies and electrical manufacturers have co-operated heartily with the telephone companies in searching for a satisfactory solution of this problem, a work which is still in progress.

News of the Electric Railways

TRAFFIC AND TRANSPORTATION

FINANCIAL AND CORPORATE • PERSONAL MENTION • CONSTRUCTION NEWS

"H" System Troubles

Confusion Follows Initial Separate Operation of New York's East and West Side Lines

For about two weeks the subway system operated by the Interborough Rapid Transit Company, in New York City has been divided into two sections, the east side and the west side systems. The completion of the Seventh Avenue line and the Lexington Avenue line made this division possible. The principle underlying the present plan is that the streams of travel from the lower part of Manhattan Island to the west side and Washington Heights section and to the Bronx section, respectively, shall be separated as much as possible so as to avoid congestion.

Provision for connection between the two main lines is made by utilizing the section of the original subway on Forty-second Street between Times Square and Grand Central Terminal as a shuttle line.

Shuttle service on Forty-second Street was attempted on Aug. 1, as stated in the issue of the ELECTRIC RAILWAY JOURNAL for Aug. 3, page 208, but owing to the fact that the construction of the transfer stations was not complete, and further because the public seemed not to be fully informed as to the *modus operandi*, the congestion was so great that the service had to be discontinued temporarily. The stations are now in process of modification, and shuttle service will be resumed as soon as practicable.

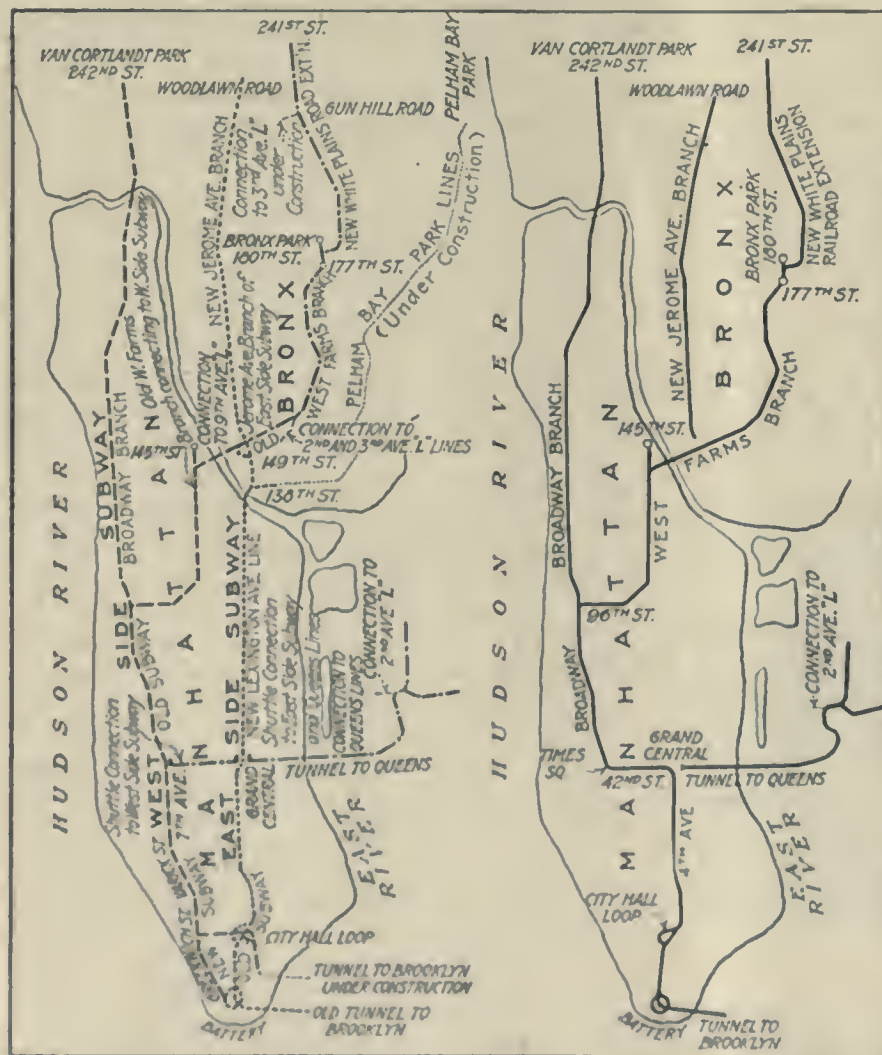
At a hearing before the Public Service Commission on Aug. 15, Frank Hedley, vice-president and general manager Interborough Rapid Transit Company, said that the difficulties experienced in the operation of the new system were due to the newness of the mechanism, especially the intricate signaling apparatus, to lack of proper terminal facilities and to shortage of men. He stated that more than 500 men are still needed to handle the system properly in spite of the addition of 500 women to the company's payroll.

The accompanying outline maps of the Interborough subway system show the several component parts and the relations of these to each other. At the left is the entire system as completed to date, with further connections now under construction represented by light lines. On the right is the system before the Seventh Avenue and the Lexington Avenue lines were opened. The west side lines in the left-hand map are indicated by dash lines, the east side lines by dotted lines. Those portions of the system which are common to both east and west side are indicated by dot-and-dash lines.

From the left-hand map it is evident that, so far as Manhattan island itself is concerned, it should be possible for a large proportion of the patrons of the road employed in the southern section of the island and living in the northern section, either east side or west side, to be carried between their homes and places of business by a direct line.

There will be no direct service to the Borough of Queens on Long Island from either east side or west side lines, but passengers who desire to go to Queens can do so by using the present tunnel from Grand Central Terminal under the East River. Unfortunately, the tunnel connecting the west side line or Seventh Avenue line with Brooklyn is not yet completed, and for the present it will be necessary for west side passengers who desire to go to Brooklyn to use the shuttle or walk a short distance down town.

The whole system of rapid transit in New York is rapidly approaching completion, but its progress has been hampered by war conditions. The policy of the Public Service Commission and the operating company has been to put each section into service as soon as available. The difficulty with the Forty-second Street shuttle service was, however, much greater than anticipated, but when the transfer stations have been permanently improved and the traffic diverted to its normal channels the "H" plan should work out smoothly.



New System Old System
PRESENT AND FORMER INTERBOROUGH SUBWAY SYSTEMS IN
NEW YORK CITY

President Mitten's Talk

Head of Philadelphia Rapid Transit Company States Frankly How the Company Is Meeting War Problems

In announcing in *The Trainman* for Aug. 6 the increase in wages of the employees of the Philadelphia (Pa.) Rapid Transit Company to which reference was made in the *ELECTRIC RAILWAY JOURNAL* for Aug. 10, page 251, the company printed the talk made by T. E. Mitten, president, to members of the co-operative committee, division superintendents and heads of departments at a special meeting called on Aug. 4 to consider war service conditions. Mr. Mitten said that the company was carrying 250,000 passengers more a day than last year. He said in part:

ONE HUNDRED CARS BOUGHT

"We have bought 100 cars for Hog Island and have just arranged to buy an additional thirty for the lines serving Chester, Essington and Lester; also 110 cars of similar type for League Island. This gives us a total of 240 new cars, and as their capacity is 50 per cent greater than the cars we now own, these 240 cars supply additional capacity equal to 360 of our present cars. Added to this, 100 open cars now being rebuilt at our shops and equipped with new trucks gives us an added capacity equal to 460 of our present cars, thus adding more than 20 per cent to the capacity of our equipment.

"Our shops are turning out fifty near-side cars per week, completely overhauled and repainted. We have contracted with the J. G. Brill Company to overhaul fifteen of the present pay-within cars per week, rewiring, repiping and repainting, and putting in manually operated doors.

"Mr. Senter (superintendent of rolling stock of the company) estimates that this, when done, will increase the efficiency of our present equipment at least 5 per cent, so that the total increased capacity of our equipment will be at least 25 per cent over that which we now have; this will give us sufficient capacity properly to care for the war workers in other plants throughout the city.

\$2,000,000 FOR TRACK AND CARS

"The cost of this work on track and cars now owned will run over \$2,000,000. The cost of the 240 new cars, over \$13,000 each, double the pre-war cost, will with the new power and other things incident to their operation require over \$4,000,000 additional. We are arranging to borrow \$4,000,000 from the government, and the \$2,000,000 required to put our track and equipment in shape we have saved up in our renewal fund during the past few years of this management.

"Since the adoption of the co-operative plan by the Stotesbury management in 1911, the maximum wage has been increased from 23 cents to 43

cents an hour and accidents reduced almost 50 per cent. Since the shake-up occasioned by the draft almost 40 per cent of our force are of new and younger element who are in need of greater experience.

"As to those who may be subject to draft, but too old or otherwise unfit for service in the trenches, we shall, because we are such an essential industry, make urgent representations to the government requesting that such men be permitted to remain with us and 'do their bit' by helping to carry government workers to and from their places of employment.

"Conditions in Philadelphia have been misrepresented to the War Labor Board, who, however, seemingly have not felt that there was any reason for their taking jurisdiction. It is, however, a reflection upon us that there should be any question of our ability and willingness to handle the affairs of this company without troubling the War Labor Board, and what I now propose is a move toward relieving their minds of any doubt as to conditions here.

"We signify our willingness to re-employ any or all of the men who, after voluntarily leaving the service, did not report for duty on May 29 last, as required by the company, and that we will permit them to remain in the service without prejudice and during good behavior at the same rate of pay as they would have received had they continued uninterruptedly with the company.

"Now as to the button question, we all remember the condition of things in 1911 when some of us were wearing the Keystone button, the Amalgamated button and the button of the Prattites. Fights on duty were an ordinary occurrence. Accidents by collision of cars increased in number; in fact, the

men were so busy trying to convert each other that they had little time left to devote to the performance of their duty.

"We still have the Keystone, the Amalgamated and the Prattites, and, therefore, cannot consider going back to the old condition of 'bedlam let loose' by allowing organization buttons to be worn while on duty—so we will have none of that.

"The meat of the button question elsewhere is that it denotes the willingness of the company to permit men to belong to the union. Well, we do that in an unqualified way without there being any need of recourse to the button to prove it, and in order to reassure the War Labor Board in this regard I suggest that we now reaffirm the principles of the co-operative plan, as adopted by the Stotesbury management in 1911, namely, that employees of the company may join and belong to any union or other organization without interference of any kind, but in order that the service to the public and to the war workers be safe and satisfactory, the rules of the company must be obeyed."

New Labor Policy for Washington

The Washington Railway & Electric Company, Washington, D. C., has announced to all of its employees that it accepts the principles adopted by the War Labor Board to govern relations between workers and employers for the duration of the war.

To the extent that any of the existing rules and regulations of the company are contrary to the letter or spirit of the announced policy of the National War Labor Board, they are, to that extent, modified for the duration of the war and until further notice.

This action does not in any way affect any of the contracts now existing between the company and any of its employees. All such contracts will be fully performed and lived up to by the company.

One of the principles adopted by the War Labor Board being that employers shall in no way interfere with the right of employees to organize in trade unions, the company voluntarily accepts that principle and will in no way interfere with its employees joining or belonging to any labor union they desire.

Another of the principles adopted by the War Labor Board being that employees in the exercise of their right to organize shall not use coercive measures of any kind to induce persons to join their organization nor to induce employers to bargain or deal therewith, the company announces that the employees will, therefore, be equally protected under the principle of the open shop from any interference with their right to remain out of labor unions if they prefer to do so.

This important change in policy on the part of the company was announced by W. F. Ham, vice-president.

Electric Railway Executives of the Country to Meet in New York on Aug. 22

The executive committee of the American Electric Railway Association has issued a call for a meeting of executives of electric railways of the country to consider recent decisions of the Federal War Labor Board. The conference will be held at the United Engineering Societies' Building, 29 West Thirty-ninth Street, New York City, at 10 a.m. on Thursday, Aug. 22.

Franchise Changes Proposed

Cincinnati Sub-Committee Report Approved by Joint Committee —Review of New Terms

The report of the sub-committee on revision of the street railway franchise at Cincinnati, Ohio, was approved by the joint council and citizens' advisory committee on Aug. 9. A complete draft of the proposed revised franchise to the Cincinnati Traction Company was embodied in the report. The rate of fare recommended will doubtless meet with opposition, but in all probability the revision will finally win, as the people of Cincinnati need improved service and an opportunity for interurban service into the city. The main provisions of the revised draft are as follows:

SERVICE-AT-COST PLAN PROPOSED

Six-cent fare, with provisions for increasing or reducing the rate, based on the cost-of-service plan.

Universal transfers.

Complete control of service and operation by the city.

Millcreek Valley line included as part of the city service.

City to have right to reroute cars at any time.

Reserve fund of \$400,000 to be created by the company.

Council to have power to order extensions and establish new and additional routes.

Freight and express service may be authorized.

Return to the company on its investment.

Entrance of interurban cars over the company's tracks.

Franchise tax of \$350,000 annually to be paid to the city, an increase of \$25,000 over the present tax.

All leases, franchises, contracts, issues of securities or transfers of franchises to be submitted to the city for approval.

Bond for faithful performance of contract requirements to be furnished by the company.

Police officials and firemen to ride free.

Arrangements for rental for use of viaducts.

Amortization of the reducible debt of \$4,000,000.

Expense of valuation and traffic survey to be repaid to the city.

Rental to be paid to the Cincinnati Street Railway, operated under lease.

Right of the city to purchase the property either by condemnation or at a valuation agreed upon.

All routes fixed in the ordinance to be retained.

RESERVE BAROMETER

The reserve fund of \$400,000 to start with will be used as a barometer to control the rate of fare. Its operation will be about the same as that of the Interest fund under the Taylor plan at Cleveland. When the amount of the fund, through surplus earnings, reaches \$650,000, an automatic reduction of one-half a cent in the rate of fare will take

place. On the other hand, if the reserve fund should be reduced to \$150,000, through the necessity of having to draw from it for the payment of expenses, the rate will automatically increase one-half cent.

When the rate of fare is reduced to 5 cents, through accumulations of surplus, the company may retain 45 per cent of the surplus, the remaining 55 per cent going to the reserve fund. Then, when the rate is increased to 5½ cents, the company's share of surplus will be reduced to 30 per cent and when 6 cents is reached, the company may retain only 20 per cent of the surplus. When the rate of fare exceeds 6 cents, then the entire surplus is to go to the reserve.

In discussing the matter, the committee said that conditions brought about by the war made a higher rate of fare necessary. Efforts were made by various organizations to keep the maximum rate at 5 cents, as it has been, but data secured by the sub-committee showed that the cost of carrying passengers at this time is 5.746 cents per revenue passenger.

The committee commented on the intercorporate relations of the companies and it would seem likely that they will be simplified so that the city may deal more directly with the parties interested.

COMPANY OBJECTS TO FINANCIAL CONTROL

Walter A. Draper, vice-president, said that the company objected to several of the provisions of the tentative draft, but was willing to bring those objections before the sub-committee, in order that time may be saved in final action. One of these was the clause which gives the city unlimited control over its financial affairs. Another was the increase in the amount of percentage tax, and a third was the retention of the purchase price of \$26,238,950 which was included in the former ordinance. The company also objected to the division of the surplus as stipulated and the inclusion of the Millcreek Valley road as a part of the city line.

After the first reading of this draft in Council, public hearings are to be held, so that the people may become acquainted with its provisions.

In approving the tentative franchise revision, before the sub-committee had reported to the main joint committee, Mayor Galvin said:

"I was very reluctant to sanction any increase in the rate of fare, but an investigation of conditions, together with the statement of the War Labor Board recommending fare increases where necessary to provide increased wages and to maintain adequate service, convinced me of the necessity for it.

"The proposed ordinance is a model instrument, and the sub-committee is

entitled to praise for the fair and equitable manner in which it has disposed of all questions arising in the negotiations between the city and the railway company. Probably in no other franchise ordinance in the country are the interests of a municipality and its car riders safeguarded so carefully.

"However, before it is finally passed I shall insist upon a clause providing that no village nor municipality adjoining Cincinnati shall have a rate of fare into Cincinnati lower than that enjoyed by Cincinnati residents."

The committee also recommended that the rate of fare on the Cincinnati, Newport & Covington Railway, or Green Line, be made 6 cents. Employees had petitioned the city to grant this rate.

The proposed new rates for both roads are meant to include a sufficient amount to allow the employees a substantial increase in wages.

Chicago Ordinance Passed

At midnight on Aug. 15 the Chicago traction ordinance was passed without important change by the City Council, to which it was referred on Aug. 5. Several minor changes, however, were made by the committee on local transportation before the measure was finally recommended for passage.

The most important change made in the ordinance was in the provision that all transfers be issued without extra charge. All previous discussion of the franchise had contemplated a charge of 2 cents for a transfer between rapid transit and surface lines. The Aldermen contended that the people would refuse to indorse the measure on this account although they now pay 10 cents for riding on both levels. The traction officials consented to the change because there is a safeguard in the provision that rates for fares and transfers may be altered to meet the cost of service, including a guaranteed return on the investment.

The pending ordinance was indorsed by representatives of the trainmen's union. The principal objections were from Aldermen who did not want the companies to have the right of nominating members for the first board of trustees. The high standing of the men who have been suggested has, however, silenced any real criticism.

Seattle Inquiry Nearing Completion

Thomas F. Murphine, superintendent of public utilities of Seattle, Wash., has practically completed the work of checking over the books of the Puget Sound Traction, Light & Power Company to determine the amount of revenue it will be necessary for the company to secure in order to meet the advance in wages which has been agreed upon, and to give the city the service demanded.

No Direct Federal Relief

Announcement has been made at the White House in Washington that President Wilson does not believe that the federal government has any authority under existing laws to take over or operate electric railways and lighting companies. This became public in connection with the local railway situation at New Orleans, in which the President was asked to interfere because of labor troubles. The Washington correspondent of the *ELECTRIC RAILWAY JOURNAL* reports that the announcement confirms statements frequently made in private during the last six months by W. G. McAdoo, director general of railroads. Acting for the President, Joseph P. Tumulty, secretary to the President, sent a telegram to Martin Behrmann, Mayor of New Orleans, expressing the attitude of the federal government. The telegram was as follows:

"The President asks me to acknowledge your important telegram of yesterday and to express his opinion that as the existing law is interpreted the federal government has no power to take over electric railways and lighting companies.

"The conditions under which such companies operate in different parts of the country vary by so wide a margin that no common rule, it would appear, or method of relief could be applied to them, and it is the President's judgment that it is imperatively necessary that local and state authorities should take the action necessary for immediate relief."

Two Extraordinary Steps

John Wanamaker has announced for both his New York and Philadelphia stores a six and one-half hour day of business, from 10 a. m. until 4:30 p. m. for two principal reasons:

1. The conservation of coal, a serious matter of importance.

2. To relieve the overcrowded street cars, trains and subways of a considerable part of their early and late rush-hour burdens, thus leaving this means of transportation free for the use of the greatly increasing army of war workers, who must in such a time necessarily get to and from their workshops without delay.

In making the announcement Mr. Wanamaker said:

"1. Whereas, in the exigencies of these critical hours, while our young men and women, relatives and employees are laying down their lives, the business men not yet called to field service are specially invoked to find a way to do something more than sell and buy Liberty Bonds and contribute to the humane and religious organizations.

"2. We business men should not wait for the officers of the government to enforce days or hours of economy. We should lead them and sustain them and do even more than we are asked."

James A. Hearn & Son, retail dry goods merchants of New York, have announced a business day from 10 a.m. to 6 p.m., for similar reasons.

News Notes

Reading Again Increases Wages.—The Reading Transit & Light Company, Reading, Pa., on Aug. 6 announced an increase in the wages of its motormen and conductors from 34 to 38 cents an hour, to be effective at once, and to 40 cents on Sept. 1.

Employees of Ohio Road Strike.—On Aug. 2 the employees of the local line of the Columbus, Delaware & Marion Electric Company at Marion, Ohio, went on strike for an increase of wages to 42 cents an hour. They had been receiving from 27 cents to 33 cents. The men refused an offer of 35 cents an hour.

Third Arbitrator Named.—Governor A. O. Stanley has named Clarence U. McElroy, Bowling Green, Ky., as the third man to compose the board to arbitrate the differences between the Kentucky Traction & Terminal Company, Lexington, Ky., and the local branch of the Amalgamated Association. The company and the men each named an arbitrator and asked the Governor to name the third.

Jersey Accepts Wage Award.—The Public Service Railway, Newark, N. J., on Aug. 9 announced through printed cards posted in the carhouses throughout the system that it had accepted the wage plan and schedule of the War Labor Board which call for 41 to 45 cents an hour. The back pay to which the men are entitled under the decision, dating June 7, will be computed and paid before Sept. 1, the date specified in the decision.

Hog Island Line Opened.—The extension of its lines into Hog Island has been completed by the Philadelphia Rapid Transit Company and service with two-car trains was begun on Aug. 5. On Aug. 3 the company operated the first unit of the Eastwick Avenue substation and on Aug. 5 the entire Hog Island line, providing for the greatly increased traffic caused by the launching of the first ship from this yard, was thrown open to the public. A review of some of the other war work of the company is contained in the statement reproduced on page 301 of this issue.

Interurban Men Get Increase.—The Ohio Electric Railway, Springfield, Ohio, has increased the wages of its interurban conductors and motormen, effective from Aug. 1. The rates of increase are: first year, from 30 cents an hour to 35 cents; second, from 31 cents to 36 cents; third, from 32 cents to 37 cents; fourth, from 33 cents to 38 cents; fifth year, from 34 cents to 39 cents; sixth year and after, 40 cents. This increase follows one on Feb. 15, which amounted to 4 cents an hour.

There are no changes at present in the wages paid motormen and conductors on city lines. These men received an advance in wages of 3 cents an hour on June 1.

P. R. T. Gets \$1,750,000 for Cars.—A contract between the Philadelphia (Pa.) Rapid Transit Company and the Bureau of Industrial Housing and Transportation, Otto M. Eidlitz, chairman, was signed on the morning of Aug. 16, under the terms of which the Philadelphia Rapid Transit Company is supplied with approximately \$1,750,000 with which to purchase ninety new cars and accessories. All of the new cars are to be used for the betterment of transportation of war workers. Sixty of the cars will be used for League Island and thirty for the Chester Short Line, serving the Westinghouse plant at Lester and the Baldwin, Remington and other plants at Eddystone, also the yard of the Sun Shipbuilding Company at Chester.

Men Have Right to Appeal.—Paul Shoup, president of the Pacific Electric Railway, Los Angeles, Cal., has announced a radical departure in connection with the dismissal of employees from the company's service, the new plan involving the departments that choose to adopt it, but not including the clerical staff or heads of departments. The outstanding features of the new plan are, first, that every employee who is discharged has the right of appeal and the assistance of a fellow employee in investigating the facts relating to his discharge; second, that he may go all the way up the line to the president if he so chooses; and third, if then not satisfied with the justice of the decision reached, he may refer it to an impartial tribunal not named by the company and having no responsibility except to do justice.

Wage Increase in Minneapolis.—The Twin City Lines, Minneapolis, Minn., has increased the wages of trainmen 3 cents an hour and added 50 cents a day to the minimum guarantee for men reporting on call. About 2500 men are affected. Previous wage increases were made on Oct. 1 and June 1. The advance now made dates back to Aug. 1. The scale is as follows: first year, 35 cents; second year, 36 cents; third year, 37 cents; fourth year, 38 cents; fifth year, 39 cents; sixth year, 40 cents, with \$3 a day for extra men. The company's statement follows: "The whole subject of increased wages was discussed, and the inability of the company to pay increased wages without an increase in the rate of fare was thoroughly considered, after which the committee agreed with the management to accept an increase of 2 cents an hour for trainmen, with an additional 50 cents a day added to the present minimum guarantee for extra men reporting on call. The new scale is to be effective as of Aug. 1 and to continue pending investigation and arbitration of the question of wages and rates of fare by the Federal War Labor Board."

Financial and Corporate

Tennessee Net Drops 14 per Cent

Increased Operating Costs Hit Nashville—Chattanooga Railway & Light Company Suffers from Strike

The gross earnings of the Tennessee Railway, Light & Power Company in 1917 totaled \$5,258,659, an increase of 7.7 per cent, but the operating expenses, rentals and taxes rose 24 per cent. As a result the net earnings at \$1,798,923 showed a loss of 14.1 per

The unsatisfactory showing of the Chattanooga company — a 36.1 per cent decrease in net earnings and 354.8 per cent decrease in net income—was due to the September-January strike of trainmen. Without the strike the year's record would have been satisfactory on account of the business to and from Fort Oglethorpe. Normal conditions have been restored, however, and the earnings are displaying increases.

The rapid and extensive expansion of the government's requirements at Fort Oglethorpe made it necessary to

COMPARATIVE INCOME STATEMENT OF SUBSIDIARIES OF THE TENNESSEE RAILWAY, LIGHT & POWER COMPANY FOR THE CALENDAR YEARS 1916 AND 1917

NASHVILLE RAILWAY & LIGHT COMPANY

	1917	1916	Increase	Per Cent
Gross earnings..	\$2,458,321	\$2,383,041	\$75,280	3.2
Operating expenses.....	1,350,361	1,245,937	104,424	8.4
Net earnings.....	\$1,107,960	\$1,137,104	\$29,144	*2.6
Taxes.....	239,057	207,251	31,806	15.3
Gross income.....	\$868,903	\$929,853	*\$60,950	*6.6
Interest.....	490,071	508,971	*18,900	*3.7
Net income.....	\$378,832	\$420,882	*\$42,050	*10.0
Preferred stock dividends.....	125,000	125,000		
Balance available for renewals, depreciation and financial requirements.....	\$253,832	\$295,882	*\$42,050	*14.2

CHATTANOOGA RAILWAY & LIGHT COMPANY

	1917	1916	Increase	Per Cent
Gross earnings..	\$1,356,342	\$1,235,623	\$120,719	9.8
Operating expenses.....	1,039,537	739,816	299,721	40.5
Net earnings.....	\$316,805	\$495,807	*\$179,002	*36.1
Taxes.....	99,366	83,628	15,738	18.8
Gross income.....	\$217,439	\$412,179	*\$194,740	*47.2
Interest.....	359,785	356,324	3,461	1.0
Net income.....	*\$142,346	\$55,855	*\$198,201	*354.8

*Decrease or deficit.

cent, and the surplus for the year at \$180,637 a loss of 72 per cent.

During 1917 the electric railway gross earnings amounted to \$2,263,457 or 43 per cent of the total, as compared to \$2,200,482 or 46 per cent in 1916. It is said to be probable that the volume of electric railway business will be substantially increased by the service in connection with the government activities at Chickamauga Park near Chattanooga and by the construction and operation of the large government powder plant near Nashville.

The accompanying statements show the progress made during the last year by the two railway subsidiaries, the Nashville Railway & Light Company and the Chattanooga Railway & Light Company. While the gross earnings of the former company showed an increase of 3.2 per cent, this was more than offset by the unavoidable increases in operating expenses and taxes. As a result the net income fell off 10 per cent. Nashville has realized very little, if any, profit from war prosperity, but it has been affected by the universal increase in cost of labor and materials and by the great advance in taxation prevalent throughout Tennessee.

complete the construction of the new high-speed electric line to Chickamauga Park, which was done during the summer of 1917 at a cost of \$102,104. This was the only large piece of construction work done during the year in Chattanooga, other construction expenditures being limited to the usual unavoidable requirements.

Texas Properties Consolidated

Consolidation of the properties of the Beaumont Electric Light & Power Company, Beaumont Traction Company and Jefferson County Traction Company, in Beaumont, Tex., and of the Port Arthur Light & Power Company, Port Arthur, Tex., went into effect on Aug. 1. Under the new arrangement, the companies will be operated as the Eastern Texas Electric Company, under the management of A. F. Townsend, who has had charge of the Stone & Webster interests in the two cities for the last two years.

The consolidation was authorized about a year ago by a referendum vote of the taxpayers of Port Arthur and Beaumont, but the arrangements were not completed until a few days ago.

Its object, as announced at the time of the authorization, is to simplify the management and financing of the properties, including their more economical operation and effective administration. There was practically no opposition.

Bankers Consider Financing Plans

Various Methods Proposed to Overcome Restriction on Lending Capacity of War Finance Corporation

Since bankers must drop the plan to organize a \$100,000,000 corporation to help public utilities, because of the ruling of Attorney-General Gregory that Section 10 of the law limiting loans to any one borrower to 10 per cent of the War Finance Corporation capital would apply to such an intermediary company, they are considering new plans for aid. The above-mentioned ruling was referred to in the issue of Aug. 10, page 254.

The capital of the War Finance Corporation is \$500,000,000, and the 10 per cent limitation would restrict loans made to any one borrower to \$50,000,000. To get around this restriction, one plan is to form a separate intermediary corporation in each city where there is a large public utility interest. If six such companies would be formed, each could borrow to the extent of \$50,000,000 from the War Finance Corporation, or a total of \$300,000,000.

As an alternative proposition, and somewhat along the same lines, is a plan to form a separate company for each group of public utility properties, such as those managed by E. W. Clark & Company, H. M. Byllesby & Company, H. L. Doherty & Company, Stone & Webster, etc. Holders of public utility securities are scattered, but it is believed that they could be reached through such an arrangement.

An entirely new proposition being given consideration in some circles is to form a separate intermediary company for practically each transaction where the amount is a substantial one, and where the amounts are small to lump several refinancing plans in one company.

Loans thus far publicly announced by the War Finance Corporation do not indicate exceedingly heavy demands upon that organization, and it is said that those unannounced will not increase the amount to any great extent. The total of \$41,655,000 represented in the four large loans announced is also subject to further modifications. There is small likelihood that the entire amount will be called for in the majority of instances. The loans include \$17,320,000 to the Brooklyn Rapid Transit Company and \$3,235,000 to the United Railways of St. Louis.

It is said that in probably all cases, loans are being made only after the applications have been submitted to the government organization best informed as to the particular war needs involved and has received its full approval.

B. R. T. Net Falls \$1,083,184

President Williams Says Railways Will Gladly Share War Burdens But Cannot Serve Without Men, Materials and Money

The report of the Brooklyn (N. Y.) Rapid Transit Company for the year ended June 30, 1918, shows net income of \$4,112,054, a decrease of \$1,083,184 compared with the previous year's figures. The gross earnings from operation amounted to \$30,506,497, an increase of slightly more than \$1,000,000, but the operating expenses totaled \$18,111,804, an increase of more than \$1,370,000. The increase in taxes and fixed charges alone amounted to \$695,189.

SERVICE IS IMPAIRED

After presenting detailed figures, which will be published later, T. S. Williams, president of the company, says that a serious impairment of service would, in the large cities, cripple the activities related to war, or that a radical curtailment of service might almost paralyze war preparations. Yet these results have already been partially realized or are imminent because the government at Washington, under war necessity, has directly or indirectly taken the following steps: Drafted tens of thousands of experienced electric railway men; diverted additional thousands to war industries; established competitive standards of wages which electric railways cannot meet with existing revenue; doubled the price of coal and made it difficult to get at any price; increased the price of every commodity which electric railways buy; absorbed or withheld materials essential to construction and maintenance; commandeered the supply of money; increased the rates of interest, and imposed millions of new taxes.

At the same time, Mr. Williams declares, the government at home has in most cases refused, or seems reluctant to grant, even the partial relief which it could give, namely, the right to increase fares and the suspension of expensive and onerous exactions. There can be but one result from a continuance of these opposite influences. Only the strongest companies can long furnish transportation at less than cost, and there are few of such companies. Whether the end be financial losses, far reaching in their affliction, or merely impairment of facilities and service, or both, the adverse effects will be a public injury and a government handicap in the national struggle.

PUBLIC IS GRAVELY CONCERNED

Continuing, Mr. Williams says:

"Electric railways and their investors will gladly bear their part of the burden of this war. Much sacrifice they must necessarily make, and of this they do not complain. Their problem is no longer one of reduced profits but of excessive losses. It has become with some a question even of preservation of corporate existence, and with all it is a question of continued ability to serve.

In any aspect of the situation grave public interest is involved. If local transportation is not an essential industry, then it must accept conditions and reconcile itself to their consequences. If it be an essential undertaking, then the systems must not merely be permitted to live but must be fully empowered to serve. They cannot serve without men, materials and money.

"The figures for 1917-1918 by no means reflect the measure of burdens to which our system will be subjected during the succeeding year. The renewal of our short-term notes for subway financing will call for \$1,154,700 of additional interest; our coal will cost at least \$1,000,000 more; our wages will increase much more than \$1,000,000; nobody now knows how much larger our taxes will be, and our other costs will correspondingly reflect the higher standards of prices and the increasing difficulties of operation.

"We need more revenue, not for dividends but for bare necessities, made abnormally severe by conditions for which we are not responsible. Nearly half our patrons are now being carried on rapid transit lines, built with public and private capital, and these as well as those carried by the surface lines are receiving their transportation for less than its cost. Certainly there is neither justice nor wisdom in such a situation."

President McCarter Fearful for Future

In the course of a review of conditions which confront his company, President T. N. McCarter of the Public Service Railway, Newark, N. J., in a statement supplementing a renewal of the company's fare appeal to the Board of Public Utility Commissioners, said:

"If the public would only stop to consider that there is no power which absolves street railways from the effects of economic laws which govern business generally, it would realize that the Public Service Railway cannot go on absorbing steadily increasing costs without getting some increase for the commodity it sells. The company must have money enough to carry on its business. No amount of specious pleading or sophistry can alter that fact. If the company is not permitted to continue the result would be a public calamity.

"For fifteen years millions of money and unstinted effort have been expended in building up the railway properties, making them a homogeneous entity. The public has benefited thereby, even to a greater degree than has the company itself. To permit the property to be disintegrated, such as would be the case were it to go into a receiver's hands, would be a step backward, from

which the State could not recover for years. The people might just as well understand that unless relief is speedily afforded a receivership is not such a remote possibility as many persons might seem to think. Other important electric railway systems are already in the hands of receivers."

Big Oil Earnings for Cities Service

Despite the difficult conditions surrounding the operations of the subsidiaries of the Cities Service Company, New York, N. Y., during 1917, and despite the deductions which were made to provide reserves for war taxes, the most important development of the year was the large increase in income. The gross income of the Cities Service Company in 1918 totaled \$19,252,493, an increase of more than 90 per cent over 1916, with net income of \$18,892,402, a gain in excess of 96 per cent. The balance applicable to dividends on the common stock and reserves was \$15,179,770, an increase of 110 per cent. This was equivalent to \$60.73 a share on the common stock outstanding in the hands of the public.

During the year \$13,898,572 was reinvested from income in properties, making a total of \$28,393,160 so reinvested from income to Jan. 1, 1918. The property values are thus being built up out of earnings at the rate of more than \$1,000,000 a month, against which no capitalization is being issued.

The great factor in the increase in earnings was the extension of oil operations. Of the gross income of the Cities Service Company, 24.6 per cent or \$4,472,652 came from public utilities, while 75.4 per cent or \$14,509,841 was derived from oil subsidiaries.

Pittsburgh Real Estate Appraisal

Under orders from the State Public Service Commission of Pennsylvania the receivers of the Pittsburgh (Pa.) Railways have appointed a board of real estate brokers to make a physical valuation of the company's real estate, which consists of about 800 parcels. The report is to be filed within the next sixty days. The men who comprise the board are A. J. Kelly, of the Commonwealth Real Estate Company, representing the city; Henry P. Haas, president of the Freehold Real Estate Company, representing the receivers, and J. W. Cree, representative of the Denny estate, who has been agreed upon by the city and the company as the third member.

The physical valuation of the company's entire property is being made at this time under the direction of a board of engineers consisting of F. Herbert Snow, Robert M. Feustel, George Warren Fuller, Morris Knowles and J. A. Emery in order that it may be determined what proper charge the company can make to the public for its service. The appointment of the valuation commission was noted in this paper for March 23, page 582.

Financial News Notes

Expects to Dismantle Road.—The Madison Light & Railway Company, Madison, Ind., expects to discontinue the operation of its railway system within the next two or three months. The company operates $3\frac{1}{2}$ miles of line.

Seeks Receiver of Cumberland Railway.—A committee of security holders has applied for a receiver for the Cumberland Railway, Carlisle, Pa. According to the petitioners, the company defaulted on the July bond interest. It is claimed further that the property is deteriorating and that the company is running behind \$2,000 a month on fixed charges and operating expenses.

Municipal Railway Operates at Deficit.—The report of New Orleans auditors on the books of the city of Monroe, La., for the last fiscal year has been submitted. According to Mayor Apgar, it shows that the municipally-owned utilities, except the local railway system, were profitable during the year. The railway lost more than \$12,000 during the year. The system consists of 10 miles of road.

Commission Reserves Abandonment Decision.—Decision has been reserved by the Public Service Commission for the Second District of New York, after hearing the final arguments on the petition of the Dunkirk (N. Y.) Street Railway, leased to the Buffalo & Lake Erie Traction Company, Buffalo, N. Y., for permission to abandon parts of its line in Dunkirk. All of the previous evidence was reviewed.

Maine Trolley Road to Be Junked.—The Rockland, South Thomaston & St. George Railway, Rockland, Me., which has been in the hands of a receiver for several weeks, was sold on Aug. 6 to the ex-president of the company, Alfred S. Black, for \$36,200. The road connects Rockland with Crescent Beach and South Thomaston. It has not been operated since last winter. It will soon be dismantled and sold for junk.

Tiffin Line to Be Abandoned.—The Tiffin, Fostoria & Eastern Railway has announced that operation on the local line at Tiffin, Ohio, will be suspended, following the refusal of the city to give a three-months' trial to a cash fare of 10 cents or six tickets for 45 cents. The City Council agreed to a temporary rate of 8 cents, but would go no higher. It is said the tracks will be removed from the streets, although the city has had street car service for more than twenty years. The inter-urban line will not be affected.

Recent Plans of General Electric Traction.—The General Electric Traction

Company announces that it has taken over the Philadelphia & Easton Electric Railway, which connects Doylestown and Easton. The General Electric Traction Company was incorporated in 1908 under the name of the Michigan & Southwestern Railroad Securities Company and the present name was taken in 1914. It has a capital of \$500,000 common stock with par value of \$5 per share and \$2,500,000 7 per cent cumulative preferred stock with \$100 par value per share. According to a recent circular of the company holders of common stock "shall be entitled to the privilege of having issued to them an equal amount, par value of 7 per cent cumulative preferred stock, when as and if issued, without the payment of any additional consideration."

Attleboro Votes to Take Part of Railway.—The Municipal Council of Attleboro, Mass., voted on Aug. 6 to seize the Briggs Corner end of the Taunton & Pawtucket Street Railway by eminent domain, and arrangements will be made at once for operating the road. The Swift-McNutt Company, Boston, Mass., owners of the line, offered to sell the section in question for \$20,000, but the Council voted only \$18,000, and as no agreement could be reached, it was decided to seize the section by eminent domain. It is reported that Mayor Sweet of Attleboro has received advices from the Interstate Consolidated Street Railway that it will operate the road on a service-at-cost plan, beginning on Sept. 1. It is probable that the Briggs Corner section will be included in this arrangement.

Pittsburgh Receivership Aftermath.—The city of Pittsburgh will not be permitted to intervene directly as a party to the receivership proceedings against the Pittsburgh Railways. This was indicated by Judge C. P. Orr, after brief argument in the United States District Court. During the hearing it was brought out that the revenue of the company under the new 5-7-cent fare will fall more than \$500,000 a year below the original estimates and that already car riding has fallen off between 13 and 14 per cent, instead of the 10 per cent estimated. After arguments on the city's petition to intervene, the Consolidated Traction Company's petition asking that the receivers for the Pittsburgh Railways be directed to pay the July rentals or turn the Consolidated Company back to its owners was taken up.

Compelled to Operate a Nuisance.—J. S. Lewis, president of the Southern Traction Company, Bowling Green, Ky., charged with maintaining a nuisance, waived examining trial before County Judge Drake and was held for the Grand Jury. Mr. Lewis was arrested, charged with operating old and dilapidated cars, making it dangerous for the public to travel, permitting boys too young and inexperienced to operate cars, and allowing trolley wires to fall on and across the streets while charged with electricity. Mr. Lewis stated that

he would have to discontinue the service until the necessary repairs were made and this may be in conflict with the order of Judge Moss, issued some months ago, when he refused to permit the railway to be sold for junk and ordered it to be operated. Some of the developments in connection with this case were reviewed in the *ELECTRIC RAILWAY JOURNAL* for Aug. 10, page 256.

Opposed to Municipal Ownership Finance Plan.—The plan of financing the purchase of the line of the United Railway from Portland to Linnton, Ore., through the sale of public utility certificates, as suggested by City Commissioner Kellaher, is fraught with many difficulties and uncertainties and is possibly invalid, according to an opinion recently rendered by City Attorney La Roche. The opinion states that the construction of such a line could be financed by the sale of bonds of the city, but that such a bond sale would have to be authorized by a vote of the people. City Attorney La Roche recommended that the safest and best way for the city to proceed, if it desired to acquire and operate a railway to Linnton, is to submit to a vote of the people a charter amendment outlining in consistent form the procedure therefor and authorizing a bond issue by the city which shall not be a general liability against the city, but to be paid solely out of the earnings of the line, or from the sale thereof.

South Bend Bondholders Asked to Co-operate.—A considerable amount of the first mortgage 5 per cent thirty-year gold bonds of the Chicago, South Bend & Northern Indiana Railway, South Bend, Ind., has already been deposited with the committee of which J. F. McNamara, 60 Wall street, New York, is secretary. The committee calls attention to the misleading statement in those bonds that they are under a first mortgage. The property covered by the mortgage has prior liens affecting the same approximately \$1,727,500. The mortgage securing these bonds contemplated the payment and retirement of the underlying prior bonds aggregating this amount, but it has not been done. Default has occurred in the payment of interest upon underlying bonds. This, the committee points out, seriously jeopardizes the security of the 5 per cent bonds. The fact that a large amount of these bonds are held by holders connected with or affiliated with the company's management, and that the obligation to pay off underlying bonds, which the committee is informed are also largely held by the same interests, shows the necessity of the co-operation of the holders of these bonds who are not connected with or affiliated with the management. The management has announced that a reorganization is necessary, and the committee believes in order that the 5 per cent bonds may be properly protected in a reorganization, co-operation is absolutely essential by the non-affiliated bondholders.

Traffic and Transportation

Toledo Increase Sustained

Court Refuses Permanent Injunction to City Against Five-Cent Fare and Transfer Charge

Judge J. M. Killits of the Federal District Court at Toledo, Ohio, on Aug. 2 refused the petition of the city of Toledo for a permanent injunction to prevent the Toledo Railways & Light Company from increasing its rate of fare. A temporary order to that effect had been in force for about three months. The company had made an increase in the rate of fare to 5 cents, with a charge of 1 cent for transfers, following an advance in the wages of trainmen about three months ago.

LIVING WAGES NECESSARY

The court said that the men must have a living wage and he requested Mayor Cornell Schreiber not to interfere with the company's present unembarrassed operation. The Mayor, however, has declared that he will carry the case to the higher court on appeal.

The court cannot fix a rate of fare and it is only when the city acts unreasonably or fails to act at all that the court has any function. Then it may determine a reasonable rate of fare. If the city does not act, or until it does act, the company has a right to fix a rate of fare to which its patrons shall conform, he said.

The company, the court said, is lawfully entitled to a rate of fare which will meet its current expenses and provide an annual return of at least \$480,000 above operating expenses. He believes that the present fare of 5 cents, with 1 cent for transfers, will not yield sufficient funds for this purpose. The city did not combat this claim, he said, but argued that some lower rate of fare should be tried as an experiment.

COMPANY NOT A TRESPASSER

The company is not a trespasser and may use the streets until the Council directs that it shall stop its cars permanently. Since the company has no franchise, the only power the city possesses is of a regulatory nature in respect to the use of the streets. Such regulations will not be lawful under the constitution of the United States unless the company is permitted to charge a rate of fare that will bring in enough revenue to pay operating expenses and 6 per cent on the actual value of the railway investment.

No attempt is made to determine whether the actual investment is represented by the amount of stocks and bonds outstanding, but it is asserted that it is fair to the patrons of the road that the net return be figured upon the actual investment, as ascertained in the usual way.

The conclusions of the court follow: "As long as wages, material and supplies are as high as now, the charge of 5 cent fares, with 1 cent for transfer, is absolutely necessary to give the company the revenue it is entitled to have; the evidence indicates that even that rate is not sufficient.

"There is nothing that can legally prevent a further raise in fares if the expenses of operation continue to increase. Fares are increasing in other cities.

"The Mayor's proposition of eleven tickets for 50 cents would not bring in revenue to pay the company's increasing operating expenses and leave anything for the investment. The city has no power under present conditions to impose and enforce such a rate. In view of the facts before the court, such a rate would be unlawful and unenforceable under the law."

The city of Toledo on Aug. 7 filed bond and took an appeal to the Circuit Court of Appeals from the decision. The court set Sept. 6 for the hearing, but granted an extension beyond that time, so that the city can prepare its case.

Six Cents for San Jose

The Railroad Commission of California has authorized the San Jose Railroads, which operates in San Jose and suburbs, between San Jose and Santa Clara, Santa Clara County, to increase fares to 6 cents where the fare was formerly 5 cents. The one-way fare between San Jose and Alum Rock has been increased from 10 cents to 15 cents, and where the rate has been 10 cents or higher, the company is allowed to sell 125 5-cent coupons for \$5. The company showed a deficit of \$131,602 for the twelve months ending April 30 last. The commission found that the facts presented at the hearing revealed an actual emergency in the affairs of the company. Since 1913 revenues have been insufficient even to pay operating expenses and interest on bonds, to say nothing of interest due on unsecured debts or a return to stockholders.

The Railroad Commission has also authorized the Peninsular Railway, operating in San Jose and Palo Alto, and between San Jose and Los Gatos, Alum Rock Park and Congress Springs, to increase its fares from 5 to 6 cents in Palo Alto and San Jose. Round-trip tickets and monthly commutation fares have been increased about 20 per cent. The evidence clearly showed that the company's operating revenue was insufficient, and immediate relief must be granted if an adequate service was to be continued.

Buffalo Vote Prospects

Active Campaign Under Way Urging Upon Voters the Need of Additional Fare for International Railway

Organized labor as represented by the Central Labor Council, and manufacturing and mercantile interests of the city as represented in the Chamber of Commerce have rallied to the support of the International Railway, Buffalo, N. Y., in its campaign for higher fares. The referendum vote on the question of whether or not the City Council's action shall be repealed in reference to the adoption of a resolution which waives certain franchise restrictions between the company and the city and allows the Public Service Commission of the Second District to fix an equitable rate of fare, will be held on Aug. 20.

There is practically no organized movement against the company's campaign to have the voters ratify the action of the City Council. Several newspapers are opposed to higher fares and a citizens' committee has been organized, but the movement in opposition has secured very little support. The action of organized labor, the Chamber of Commerce and other civic and commercial organizations which have come out boldly for higher fares appears to have crushed all opposition at the outset of the campaign.

REFERENDUM FEARED AT FIRST

When it was first suggested that a referendum be held on the question, Henry W. Killeen, of Penney, Killeen & Nye, of counsel for the International Railway, said that if the matter was put before the people for a vote, the 6-cent fare would be overwhelmingly defeated. Such does not now seem to be the prospect. From appearances on the surface, it is generally believed that the voters will affirm the action of the Council. The Public Service Commission will then make an investigation of the financial condition of the company and a rate of fare fixed which will be put into effect on the company's city lines.

Edward G. Connette, president of the International Railway, in a letter to members of the City Council, called attention to the fact that the gross receipts of the company inside the city in 1917 were \$8,250,000. He says that the gross receipts so far this year are below those for the corresponding period of last year, but even assuming they are the same, the actual operating expenses will be more than the company's income if the 5-cent fare is allowed to remain in force.

Small printed slips are being placed in the pay envelopes of the workers in munitions plants asking them to vote for the ratification of the Council's action. The slips point out that the additional cent will be used largely for giving the railway employees a wage increase and call upon the patriotism of workers to support the government by not allowing a strike.

Oregon Commission Had Jurisdiction

In Portland Six-Cent Case, State Supreme Court Upholds Commission Rate Change

The authority of the Public Service Commission of Oregon to adjust the fares of the Portland Railway, Light & Power Company was upheld by the State Supreme Court on July 23 when it affirmed the lower court for Multnomah County in the case of the city of Portland against the Public Service Commission, known as the 6-cent fare case. The opinion, written by Justice Burnett, was in part as follows:

REVIEW OF CASE

"The city of Portland, a municipal corporation, instituted this suit against the Portland Railway, Light & Power Company, and thereby seeks to nullify an order made by the defendant, the Public Service Commission of Oregon, allowing the company to charge 6 cents for the transportation of each person over its lines in the same general direction, instead of 5 cents, as prescribed by an ordinance enacted by the Council of the plaintiff and conferring upon the company the franchise under which it operates. A general demurrer to the complaint was sustained by the circuit judges in Multnomah County, sitting *en banc*. The city appealed.

"The essence of the dispute presented in this litigation is, whether upon the application of a public service corporation like the company, the Public Service Commission of the State had the authority to change the rate of fare prescribed by the city ordinances giving the company the right to operate street railways in the city of Portland. The proper disposition of this suit depends upon the solution of that question of jurisdiction. We are not concerned with the wisdom of the commission's decision. Whether or not it acted wisely in increasing the rate of fare is not for our decision in this case on demurrer to the bill. If we find that it had jurisdiction to make the change, our quest is ended.

"Section 51 of the act creating the Public Service Commission empowers the commission, after investigation, to order the substitution of reasonable rates and charges instead of those which it shall find to be unjust and unreasonable, and, by the following section, it may afterward revise its own decision.

NO VIOLATION COMMITTED

"The city says the action of the commission is void because it violated the constitutional provisions forbidding any state to impair the obligation of a contract, and that it deprived the city of Portland and its inhabitants of their property and rights without due process of law. This presents the principal question for consideration. It is urged that the ordinance under which the railway and its predecessors in interest have acted were offers to them which they were required to, and did, accept

before proceeding to operate their plant, and that this constituted a contract between the city of Portland and the company which cannot be violated by any subsequent legislation.

"In support of its contention in this respect, the city cites *Cleveland vs. Cleveland Railway*, 194 U. S. 597; *Detroit vs. Citizens' Street Railway*, 184 U. S. 368, and *Detroit United Railway vs. Michigan*, 242 U. S. 238. In all those cases the State had expressly and literally authorized the municipality in so many words to adjust the matter by contract.

"The Portland charter under consideration says nothing about a contract, but speaks of a grant and requires legislative action. True it is that the franchise does not become operative until the grantee has accepted. The term 'grant' implies offer of the city and acceptance by the company, for the municipality cannot fashion a grant and compel anyone to accept it. The distinction is too finely drawn whereby government control of rates according to reasonableness is applicable to the so-called 'grant' cases and withheld from those which may be called 'contract' cases. But all of such conventions, whether of pure contract or by public grant, are made subject to the ever-present principles that the charges shall be fair and reasonable and that the right to adjust them is primarily the prerogative of the State.

"Finally, the complaint urges that the order of the commission is void because the public utilities act is not retroactive. This contention may be dismissed with the statement that the law does and is designed to deal with conditions as they arise and to adjust matters relative to concerns serving the public from time to time as may be required. The Circuit Court was right in dismissing the bill and its decision is affirmed."

The argument before the six judges of Multnomah County in this case was reviewed in the *ELECTRIC RAILWAY JOURNAL* for March 16, page 543, while the decision of that court in the case was abstracted in this paper for March 30, page 617.

Interurbans Have Fare Rights

The Public Service Commission of Pennsylvania in an opinion dated July 31 ruled that an interurban electric railway may increase its fares beyond the 5-cent limit specified in a franchise ordinance when it is necessary to do so to provide enough revenue for operation and maintenance and to permit a fair return to investors.

The decision was given in dismissing complaints made against the Buffalo & Lake Erie Traction Company, which has a line in Erie County. The ruling, which has a State-wide application, was given on the complaints made by North

East Borough, Harbor Creek and North East Townships, Erie County, and as a part of the proceeding a physical valuation of the company's properties in Pennsylvania was made by the commission's engineers.

It is similar to a ruling in another case that the commission could take jurisdiction in a complaint that a fare specified in a franchise ordinance had been exceeded and it is possible an appeal will be taken to the Superior Court.

The commission decided the case after an exhaustive study of values and declares that rates on other lines radiating out of Erie are higher; that not enough has been set aside out of earnings for depreciation and that there was no evidence offered that the increase was discriminatory.

John S. Rilling, a member of the commission, adds to the decision a concurring opinion in which he says in part:

"The municipal consent provided by the constitutional provision is merely the acquiescence by the municipality to the doing of that which the company through its charter has a legal right to do. The consent does not add one iota of additional power to the company to construct its lines. * * * Municipalities in Pennsylvania do not now have nor have they ever had the power or authority to regulate the rate of a public utility."

He continues to the effect that the Public Service Commission "is armed with the unabridged police power of the State" and that "no rate regulations passed by municipalities in franchise ordinances, whether prior to or after the enactment of the public service law, can interfere with the proper exercise by the commission of the rate-regulating authority delegated to it by that law."

Six Cents for East St. Louis

Officials of the East St. Louis (Ill.) Railway were notified on Aug. 9 by the Illinois Public Utilities Commission that a 6-cent fare had been granted as an emergency relief, and that a second hearing of the company's petition asking a 7-cent cash fare will be held later.

The Alton, Granite City & St. Louis Traction Company, a subsidiary of the East St. Louis & Suburban Railway, which also controls the East St. Louis Railway, on Aug. 9 began collecting a 7-cent fare on city lines in Alton and on a connecting line between Venice and Brooklyn.

L. C. Haynes, president of the company, said that the company hoped to get a 7-cent fare in East St. Louis at the next hearing. The 6-cent fare will add approximately \$150,000 to the yearly income of the East St. Louis company, officials estimated.

The Alton, Granite City & St. Louis Traction Company was also recently granted authority by the commission to collect a 3-cent-a-mile cash fare and 2-cent ticket fare on its interurban lines. The new rates went into effect several weeks ago.

Higher Fares Granted in 238 Cities

Nearly 10,000,000 Out of 41,000,000 of Urban Population in the United States Are Now Paying More Than Five Cents

Supplementing the list of fare increases printed in last week's issue of the ELECTRIC RAILWAY JOURNAL the Information Bureau of the American Electric Railway Association has analyzed the data on fare increases and arranged them for convenient reference in the accompanying tabular forms.

Out of a total urban population in the United States of 41,000,000, about 9,950,000, or more than 24 per cent, are paying fares higher than 5 cents.

The number of cities involved in the higher rates of fare is 238, and they are located in thirty-two of the forty-eight states of the Union and four of the eleven provinces of Canada.

The method of increase ranges from a raise to a straight 10-cent fare to the abolition of workmen's reduced rates. A summary of methods used follows:

Ten-cent fare 3 cities.
Eight-cent fare 1 city.
Ten-cent owl service; 7-cent regular 1 city.

Ten-cent owl service; 6-cent regular 1 city.
Ten-cent owl service; 5-cent regular 5 cities.
Seven-cent fare 39 cities.
Six-cent central zone with additional charge for ride outside 16 cities.
Six-cent fare 83 cities.
Five-cent central zone with additional charge for ride outside 11 cities.
Five-cent fare; 1-cent charge for transfer 17 cities.
Reduced rates eliminated 42 cities.
Four-cent fare; 1-cent charge for transfer 1 city.
Workmen's reduced rates abolished 18 cities.

FARE INCREASES IN THE UNITED STATES AND CANADA

Cities in Which a 10-Cent Fare Is Being Charged

Name	Population
Tacoma, Wash. (on municipal lines)	112,770
Manistee, Mich.	12,381
Spencer, Mass.	6,740

Cities in Which an 8-Cent Fare Is Being Charged

Name	Population
Reading, Pa. (suburban lines)	109,381

Cities in Which an 8-Cent Fare Is Being Charged for Owl Service and a 6-Cent Fare at Other Times

Name	Population
Edmonton, Canada (municipal lines)	70,000

Cities in Which a 10-Cent Fare Is Being Charged for Owl Service and a 5-Cent Fare at Other Times

Name	Population
Montreal, Canada	600,000

Cities in Which a 10-Cent Fare Is Being Charged for Owl Service and a 5-Cent Fare at Other Times

Name	Population
Ottawa, Canada	110,000
Des Moines, Iowa	86,368
Little Rock, Ark.	61,627
Lincoln, Neb.	52,500
Fort William, Canada (municipal lines)	16,499

Cities in Which a 7-Cent Fare Is Being Charged

Name	Population
Boston, Mass.	756,476
Cambridge, Mass.	112,981
Tacoma, Wash. (by privately-owned company)	112,770
Somerville, Mass.	87,039
Manchester, N. H.	78,283
Malden, Mass.	51,155
Chelsea, Mass.	46,192
Newton, Mass.	43,715
Everett, Mass.	39,233
Joliet, Ill.	38,010
Brookline, Mass.	32,730
Waltham, Mass.	30,570
Wilmington, N. C.	29,892
Shenandoah, Pa.	29,201
Lewiston, Me.	27,809
Medford, Mass.	26,234
Meridian, Miss.	23,285
Ocean City, N. J.	20,000
Bartlesville, Okla.	20,000
Mahanoy City, Pa.	17,463
Ogdensburg, N. Y.	16,718
Woburn, Mass.	15,969
Augusta, Me.	14,170
Watertown, Mass.	14,867
S. Framingham, Mass.	13,982
Arlington, Mass.	12,811
Waterville, Me.	12,702
Winthrop, Mass.	12,692
Chambersburg, Pa.	11,800
Carleton, Pa.	10,726
Keene, N. H.	10,633
Natick, Mass.	10,102

Name	Population
Middleborough, Mass.	9,048
Lexington, Mass.	4,918
Canton, Mass.	4,797
Girardville, Pa.	4,396
Mauch Chunk, Pa.	3,952
Sharon, Mass.	2,310
Brookfield, Mass.	2,204

Cities Which Have a 6-Cent Central Zone, With an Additional Charge for Rides Outside Thereof

Name	Population
Fall River, Mass.	128,366
Lowell, Mass.	113,245
Lynn, Mass.	102,425
Lawrence, Mass.	100,560
Brockton, Mass.	67,449
Malden, Mass.	51,155
Salem, Mass.	48,562
Haverhill, Mass.	48,477
Chelsea, Mass.	46,192
Quincy, Mass.	38,136
Taunton, Mass.	36,283
Gloucester, Mass.	24,395
Beverly, Mass.	21,645
Peabody, Mass.	18,360
Melrose, Mass.	17,445
Hyde Park, Mass. (Bay State lines)	16,000

Cities in Which a 6-Cent Fare Is Being Charged

Name	Population
St. Louis, Mo.	757,309
Montreal, Canada	600,000
Kansas City, Mo.	297,347
Portland, Ore.	295,463
Vancouver, Canada	230,000
Pittsburgh (suburbs)	230,000
West Penn Railways)	149,685
New Haven, Conn.	121,579
Bridgeport, Conn.	118,158
Hartford, Conn.	110,000
Reading, Pa.	109,381
Kansas City, Kan.	99,437
Wilmington, Del.	94,265
Waterbury, Conn.	86,973
Wilkes-Barre, Pa.	76,776
Elie, Pa.	75,195
Atlantic City, N. J.	57,660
Saginaw, Mich.	55,642
New Britain, Conn.	53,794
McKeesport, Pa.	47,721
Chester, Pa.	41,396
Lexington, Ky.	41,097
Jackson, Mich.	35,363
Aurora, Ill.	34,204
Stamford, Conn.	30,884
Easton, Pa.	30,530
Poughkeepsie, N. Y.	30,390
Mt. Carmel, Pa.	30,268
Battle Creek, Mich.	29,480
Meriden, Conn.	29,130
Elgin, Ill.	28,203
Nashua, N. H.	27,237
Norwalk, Conn.	26,899
Hagerstown, Md.	25,679
Paducah, Ky.	24,842
Middletown, Conn.	22,799
Danbury, Conn.	22,556
White Plains, N. Y.	22,465
Pottsville, Pa.	22,372
Duquesne, Pa.	19,964
Northampton, Mass.	19,926
Oil City, Pa.	19,297
Peekskill, N. Y.	18,530

Name	Population
Torrington, Conn.	18,018
Sioux Falls, S. D.	16,499
Woburn, Mass.	15,969
Ithaca, N. Y.	15,848
Calro, Ill.	15,794
Fairmont, W. Va.	15,566
Jacksonville, Ill.	15,481
Connellsville, Pa.	15,455
Chickasha, Okla.	15,447
Newburyport, Mass.	15,273
Ansonia, Conn.	15,152
Rutland, Vt.	14,331
Hornell, N. Y.	14,685
Milford, Mass.	14,110
Naugatuck, Conn.	14,093
Albuquerque, N. M.	14,025
Meadville, Pa.	13,802
Plymouth, Mass.	13,743
Geneva, N. Y.	13,711
Ossining, N. Y.	13,705
Dover, N. H.	13,272
Wakefield, Mass.	12,733
Greenfield, Mass.	11,998
Laurel, Miss.	11,779
Beacon, N. Y.	11,555
Latrobe, Pa.	11,393
Frederick, Md.	11,112
Danvers, Mass.	9,949
Rochester, N. H.	9,719
Derby, Conn.	9,655
Athol, Mass.	9,461
Braintree, Mass.	9,376
Claremont, N. H.	7,529
Maynard, Mass.	6,890
Stoughton, Mass.	6,316
Branford, Conn.	6,047
Amherst, Mass.	5,112
Bellows Falls, Vt.	4,883
Waverly, N. Y.	4,856
Randolph, Mass.	4,301

Cities Which Have a Central 5-Cent Zone With an Additional Charge for Rides Outside Thereof

Name	Population
Pittsburgh, Pa.	579,090
Milwaukee, Wis.	436,535
Providence, R. I.	254,906
Springfield, Mass.	105,942
Holyoke, Mass.	62,286
Pawtucket, R. I.	59,411
Woonsocket, R. I.	44,360
Norwich, Conn.	29,419
Chilcope, Mass.	29,319
New London, Conn.	20,985
Westfield, Mass.	18,391

Cities Having a 5-Cent Fare With an Additional Charge of 1 Cent for a Transfer

Name	Population
Newark, N. J.	408,394
Jersey City, N. J.	306,345
Toledo, Ohio	191,654
Paterson, N. J.	138,443
Trenton, N. J. (Public Service Railway)	111,593
Camden, N. J.	106,233
Elizabeth, N. J.	86,690
Hoboken, N. J.	77,214
Passaic, N. J.	71,744
Bayonne, N. J.	69,893
Perth Amboy, N. J.	41,185
Orange, N. J.	33,080
Plainfield, N. J.	25,805
New Brunswick, N. J.	25,512

Name	Population
Meridan, Miss.	21,818
Hackensack, N. J.	16,945
Rahway, N. J.	10,219

Cities in Which Reduced Rate Tickets Have Been Abolished and a Straight 5-Cent Fare is Charged

Name	Population
Seattle, Wash.	348,639
Salt Lake City, Utah	117,399
Des Moines, Ia.	101,598
Duluth, Minn.	94,495
St. Joseph, Mo.	85,236
Evansville, Ind.	76,078
Altoona, Pa.	58,659
Roanoke, Va.	48,284
Decatur, Ill.	39,631
Joliet, Ill.	38,010
Quincy, Ill.	36,798
Everett, Wash.	34,468
Columbia, S. C.	34,611
Lynchburg, Va.	32,940
Danville, Ill.	32,261
Sheboygan, Wis.	28,559
Bloomington, Ill.	27,258
Muncie, Ind.	25,424
Galesburg, Ill.	24,276
Anderson, Ind.	23,996
New Albany, Ind.	23,629
Shamokin, Pa.	21,129
Fond du Lac, Wis.	21,113
Asheville, N. C.	20,823
Marion, Ind.	19,834
Greensboro, N. C.	19,577
Kingson, Canada	18,874
Owensboro, Ky.	17,784
Vincennes, Ind.	17,645
Muscatoine, Ia.	17,600
Hot Springs, Ark.	17,238
Fort William, Canada (except children)	16,499
Bluefield, W. Va.	15,442
Champaign, Ill.	14,508
Bridgeton, N. J.	14,395
Cortland, N. Y.	13,069
Highpoint, N. C.	12,896
Elwood, Ind.	11,028
Jeffersonville, Ind.	10,412
Urbana, Ill.	9,889
Waynesboro, Pa.	7,189
Tyrone, Pa.	7,176

Cities Having a 4-Cent Fare With an Additional Charge of 1 Cent for a Transfer

Name	Population
Cleveland, Ohio	674,073

Cities in Which Workmen's Reduced Rate Tickets Have Been Abolished

Name	Population
Toledo, Ohio	191,654
Shamokin, Pa.	19,588
Biddeford, Me.	17,665
Gary, Ind.	16,802
Greensboro, N. C.	15,895
Greenfield, Mass.	11,998
Bluefield, W. Va.	11,188
High Point, N. C.	9,625
Sanford, Me.	9,049
Concord, N. C.	8,715
Claremont, N. H.	7,529
Salisbury, N. C.	7,153
Valparaiso, Ind.	6,987
Stoughton, Mass.	6,316
Randolph, Mass.	4,301
Spencer, N. C.	3,000
Hadley, Mass.	2,000
Graham, Va.	2,000

Against Fare Increase

Pennsylvania Commission Orders Reduction From Eight Cents to Six Cents—Company Explains

The Public Service Commission of Pennsylvania has sustained a complaint of the Borough of Ashland against the action of the Schuylkill Railway in advancing fares from 6 cents to 7 cents on May 28, 1917, and has ordered the old 6-cent rate restored.

The commission has ordered a reduction of fares on the entire system. As the company has been charging an 8-cent fare since July 12 the decision of the commission will mean a 2-cent reduction in all zones.

The company first announced its intention of increasing fares from 5 cents to 6 cents in 1913. The Ashland Borough filed a protest against the increase but the commission ruled at that time that the burden of proof was on the complainant and the increase was sustained.

Later the company filed a new tariff, effective on May 28, 1917, increasing the rate of fare from 6 cents to 7 cents. Ashland Borough again filed a protest and in this case the commission decided that the burden of proof was on the railway. While a decision was still pending the company filed another tariff, effective on July 12, making a further increase in fares from 7 cents to 8 cents. Ashland Borough complained against the increase because a decision was pending in the case of the raise from 6 cents to 7 cents.

COMMISSION UNDER MISAPPREHENSION

The failure of the Schuylkill Railway to rescind its 8-cent fare and put into operation again the 6-cent fare as ordered by the commission in its opinion recently handed down, is explained in a statement issued by the management. Meanwhile the company has appealed for a rehearing and the operation of the order is held in abeyance. The company says in part:

"The company has filed its notice of an application for rehearing of the case, because a compliance with the commission's order to return to the 6-cent fare would result in the forced shutting down of its entire operations. The company simply could not live on a 6-cent fare.

"The reasons assigned by the commission in support of its 6-cent fare order are based upon a complete misapprehension of the facts in the case. The company will endeavor to make them clear on the rehearing. This evidence will not only show conclusively that the company cannot live on a 6-cent fare, but it will show that the revenue which it will earn even with an 8-cent fare will be insufficient to enable it to continue operation at full efficiency without practice of the most rigid economy.

"The officials of the company regret that this misapprehension of the facts on the part of the commission should have resulted in a situation where the company might seem to be unrespon-

sive to the commission's order, but they feel confident that the facts in the case justify them in the position which they have taken and that upon rehearing they will be able completely to vindicate this position before the commission and in the public mind and maintain the 8-cent fare."

Basis of Portland Rates

Statement Showing Conditions Under Which Recent Maine Settlement Was Reached

A reference to the recent fare agreement at Portland, Me., was made in the *ELECTRIC RAILWAY JOURNAL* of Aug. 3, 1918, page 213. The agreement terminates a rate case of long standing, and was made between Attorney-General Sturgis of Maine and W. S. Linnell, representing the Cumberland County Power & Light Company, upon the recommendation of R. M. Feustel, of Sloan, Huddle, Feustel & Freeman, consulting engineers for the Public Utilities Commission of Maine.

The system of rates recommended by the State's engineers and that submitted by the company were identical in that both contemplated the creation of a central zone with a fare of 6 cents, and outside zones, about 1 mile long, with a fare of 2 cents per zone, on the interurban lines. The two plans differed in the limits of the central zone, the State's plans permitting a longer ride than the company's. As stated in this paper, the 5-cent fare has also been retained on three lines operating entirely within the central zone and in the short-haul territory, a charge of 1 cent, however, being made for each transfer issued from the 5-cent lines. There is no charge for transfers from 6-cent cars.

Sloan, Huddle, Feustel & Freeman found that the company required \$123,000 additional revenue a year to meet the increasing costs of labor and material, and they estimated that the increased revenue yielded by their suggested schedule would be a minimum of \$110,000 a year. They reported that certain rerouting suggestions made by the company were feasible and that approximately \$20,000 a year could be saved if these were put into effect. The valuations of the State and of the company showed the value of physical property (on the Portland Railroad) to be in excess of the outstanding stocks and bonds. The cost of reproduction now as found by the State's engineers was about \$5,263,000, exclusive of promotion and the cost of securing capital. The company's figure, \$7,524,000, included these items. The Public Utilities Commission did not determine the fair value of the property, but allows the company, on twenty-four hours' notice, to put into effect the fare schedules proposed by the State's engineers. The company's valuation was prepared by George E. Haggas, assistant to the general manager of the Cumberland County Power & Light Company.

Vancouver Fares

British Columbia Electric Railway Increases Fares with Little or No Opposition or Trouble

Brief mention was made in the *ELECTRIC RAILWAY JOURNAL* for July 20, page 135, of the fare situation on the British Columbia Electric Railway, Vancouver, B. C. On finding it necessary to pay the full wage demands of its employees the company informed the City Councils of Vancouver, New Westminster, North Vancouver, South Vancouver, Point Grey and Burnaby that it was impossible to operate on the fares then in force. The Vancouver City Council passed a by-law authorizing higher fares. The Point Grey Council did the same. The South Vancouver commissioners some days later also authorized the company to increase fares. Subsequently the New Westminster City Council passed a resolution and will pass a by-law authorizing increased fares.

Accounts recently to hand indicate that North Vancouver is still debating the matter, while Burnaby has refused permission to the company to advance rates. On Vancouver Island the City Council of Victoria also refused permission to the company to increase fares.

ONLY ONE OBJECTOR

On July 16 the company was operating cars in Vancouver and New Westminster on a 6-cent fare. These systems, of course, are separate. The Victoria City system is operating on a 5-cent fare to all passengers. The North Vancouver city system was shut down at that time pending permission to charge a 6-cent fare. The fares on the Vancouver System now are: 6-cent cash fare or six tickets for 35 cents instead of 5 cents cash and six tickets for 25 cents. On those portions of the city lines extending into South Vancouver and Point Grey a 6-cent fare is charged within each of the municipalities. The fare from Vancouver City to South Vancouver and Point Grey is 7 cents, and settlers' tickets are sold ten for 70 cents. The cash fare is, of course, 12 cents, 6 cents in each district. The Burnaby municipality having refused permission to the company to charge higher rates, the railway is not operating the 2-mile strip of city line there and indications point to the possible necessity of the company forfeiting its franchise in that place.

Where city passengers are carried on interurban lines the fares within the city have, of course, been advanced to 6 cents. The fare from Vancouver to Beaconsfield on the Central Park line, formerly 5 cents, is now 7 cents.

The fares on all the interurban lines will probably be revised shortly and put on a mileage basis.

The 6-cent fare has taken very well with the public. There was practically no opposition, and little or no difficulty was encountered in handling the odd cent. There is a very large demand for strip tickets.

Tumult and Shouting

Detroit Railway Abandons Six-Cent Fare Following Protest That Vents Itself in Violence

Disgraceful scenes were enacted in Detroit, Mich., on Aug. 10, 11 and 12, when political candidates incited the lawless element of the population to violence, destruction and bloodshed, following the action of the Detroit United Railway in raising fares from 5 cents to 6 cents. A number of people were injured and thousands of dollars worth of damage was done to property of the railway. Cars were overturned and wrecked; car doors and windows were smashed and mob rule generally prevailed. The police appeared to be helpless.

The disorder occurred when political candidates advised the people to pay only 5 cents and the Common Council adopted an ordinance fixing the rates of fare on non-franchise lines at 5 cents for a single ride, six tickets for a quarter and workmen's tickets at eight tickets for a quarter.

At midnight Monday when the ordinance went into effect the city secured an injunction in the Wayne Circuit Court restraining the railway officials from violating the ordinance. The following morning company officials appealed to the local federal court for an injunction to restrain the city from enforcing the ordinance. This injunction was refused by Judge Tuttle. The court declared that the city should settle the railway question by giving the company a franchise or by buying and operating the lines. The company at once prepared to appeal direct to the United States Supreme Court at Washington.

In the meantime the company is accepting 5-cent fares and will in a few days sell six-for-a-quarter tickets and workmen's tickets.

Immediately following the refusal of the federal judge to interfere, F. W. Brooks, president of the company, telegraphed to W. H. Taft and Frank P. Walsh of the National War Labor Board, calling attention to the situation in Detroit. Mr. Brooks declared that the recent wage increase awarded Detroit United Railway motormen and conductors by the War Labor Board would increase the company's expenses by at least \$2,000,000 a year. He pointed out that the Common Council not only refused to permit a higher fare so that additional revenue to meet increases might be had, but enacted an ordinance reducing the fares, which the Labor Board had emphatically declared too low. Mr. Brooks said that the company was endeavoring to maintain service so that the munition factories would not be crippled, but warned that unless immediate relief were given the company would have to abandon service.

During the riots the company was forced to abandon service on four or five lines to save the employees from violence and to protect property from destruction. In dozens of cases when

passengers refused to pay more than 5 cents the car crews refused to move the cars or ran cars onto side tracks and left them there. Saturday and Sunday riots were of frequent occurrence in the downtown streets, while in the factory districts cars were overturned and wrecked.

In a statement to the public on Aug. 13 President Brooks of the company placed the responsibility for the rioting, robbery and destruction of property on the politicians, the Common Council and the newspapers.

Transportation News Notes

Interstate Line Wants Increase.—The Cleveland & Erie Railway, which operates between Erie, Girard and East Springfield, Pa., and Conneaut, Ohio, on Aug 13 asked the Interstate Commerce Commission for increases to 3 cents a mile in cash train fares, 25 per cent increase in freight rates, and an advance to 7 cents in rates in Erie, Pa.

Withdrawal of Tickets Recommended.—A. L. Murphine, superintendent of public utilities of Seattle, Wash., in a recent communication to the Council, recommended a straight 5-cent car fare on all municipal lines. Mr. Murphine states that the expense of handling paper tickets should be eliminated. At present twenty-five tickets are sold for \$1.

Springfield Seeks Higher Fares.—The Springfield (Mass.) Street Railway has filed a request with the Public Service Commission for authority to charge double fares on its city lines between midnight and 4.59 a. m. The company also seeks permission to increase the unit fare from 5 cents to 6 cents at all hours on the city lines within the central zone of fares.

Reduces Minimum Fare.—The Public Service Commission of Massachusetts has approved a reduction of the minimum fare on the Grafton & Upton Railroad, Milford, Mass., from 10 cents to 6 cents. The road was under federal control and was obliged to charge a minimum rate of 10 cents, but being one of the so-called short lines soon found its business falling off.

Seven Cents Asked in Minneapolis.—The Minneapolis (Minn.) Street Railway, controlled by the Twin City Rapid Transit Company, has filed with the City Council its application for increased fares. Horace Lowry, president of the company, stated in the application that a 7-cent fare was necessary in view of recent developments heavily increasing the cost of operation.

New Buffalo-Lockport Tariff.—According to a tariff schedule of the Buffalo, Lockport & Rochester Railway,

Rochester, N. Y., one-way cash fares on its line are increased from approximately 2½ cents a mile to 3 cents a mile, one-way ticket fares are increased from 2¼ cents a mile to 2½ cents a mile, and round-trip fares are increased to double the one-way fares.

Ticket Boxes on St. Louis Cars.—Separate boxes for tickets have been placed on all cars of the United Railways, St. Louis, Mo. Bruce Cameron, superintendent of transportation, says that the boxes have been installed to relieve the conductors of the extra duty of handling and punching the tickets, thus giving the men more time to make cash change, handle transfers and run the cars.

Youngstown May Adopt Principles of Tayler Grant.—A committee of the City Council of Youngstown, Ohio, spent some time during the week ending Aug. 10 in Cleveland studying the operation of the Cleveland railway and the amendment to the Taylor service-at-cost franchise granting an increased fare temporarily. It is said that the fare in Youngstown may have to go higher than 5 cents.

Six Cents for Worcester.—Mayor P. G. Holmes of Worcester, Mass., is said to have secured assurances from Francis H. Dewey, president of the Worcester Consolidated Street Railway, that the proposed 6-cent fare for that city is only for the period of the war. Six-cent fares already are in force on the suburban lines of the company. The 6-cent fare went into effect in Worcester on Aug. 1.

Use of One-Man Cars Put Off.—The use of one-man cars on the lines of the Galesburg Railway, Lighting & Power Company, Galesburg, Ill., has been postponed for the present. The company will pay the wage scale proposed by the War Labor Board, the scale to run from 38 to 41 cents an hour. Reference to the probable use of one-man cars by the company was made in the *ELECTRIC RAILWAY JOURNAL* for July 27, page 176.

Asbury Park Road Wants Increase.—The Atlantic Coast Electric Railway, Asbury Park, N. J., has applied to the Board of Public Utility Commissioners of New Jersey, for permission to increase its fare from 5 cents to 7 cents. This would make the fare from Asbury Park to Long Branch 21 cents instead of 15 cents and the fare to Spring Lake 15 cents instead of 10 cents. The hearing has been set by the commission for some time in September.

Gorge Road Will Charge More.—The Niagara Gorge Railway, Buffalo, N. Y., has filed with the Public Service Commission for the Second District a new tariff schedule, relative to commutation fares which will become effective on Sept. 1. Ten-trip individual, twenty-trip family or firm, forty-six-trip monthly school and sixty-trip monthly individual between Niagara Falls, Lewiston and Youngstown and local points will be advanced approximately 10 per cent.

Washington to Ask More.—Application for authority to charge an increased rate of fare on all its lines will be made to the Public Utilities Commission by the Washington Railway & Electric Company, Washington, D. C. The exact measure of relief to be sought has not been determined. It may take the form of a request for a straight 5-cent fare or a 6-cent fare with the privilege of buying five tickets for a quarter. In addition, a 1-cent transfer charge may be proposed.

Want Franchise Revised.—Charles S. Thrasher and Charles M. Leslie, receivers of the Interurban Railway & Terminal Company, Cincinnati, Ohio, have filed with the Commissioners of Hamilton County an application for a revision of the franchise of the company in such a way as to eliminate all restrictions as to the rates of fare and the manner of operation. Should this be granted, the company will then ask the Public Utilities Commission to fix the rates of fare to be charged.

One-Man Car a Fixture.—The one-man car has come to Dallas, Tex., to stay, according to Richard Meriwether, general manager of the Dallas Railway. Mr. Meriwether explained that the one-man cars now in service on the Akard-San Jacinto line have proved satisfactory to patrons and to the company. Additional one-man cars have been ordered and will be installed on other lines as soon as they are received. The skip-stop plan of operation will be put into effect on all lines in Dallas at once.

New Jersey Rehearing on Aug. 29.—The Board of Public Utility Commissioners of New Jersey announced at the close of a conference on Aug. 7, that it would sit at Newark on Aug. 29 to hear arguments upon the petition filed by the Public Service Railway asking a reopening of the fare case in which it petitioned for a 7-cent fare, 2 cents for a first transfer and 1 cent for a transfer on a transfer. The company was recently allowed to charge 1 cent for transfers, but was refused an increase in the cash fare.

Gary Wants Six Cents.—The Gary (Ind.) Street Railway has filed a petition with the Public Service Commission of Indiana asking for a 6-cent fare in and between the cities of Gary, East Chicago and Hammond and for an 8-cent fare for certain other towns. The recent order of the War Labor Board, increasing the wages of motormen and conductors, will cost the Gary Street Railway approximately \$55,000 a year. The company seeks additional revenue in order to compensate it for this increase in expenses.

Receiver Would Increase Fares.—C. J. Minton, receiver for the Winona Interurban Railway, Warsaw, Ind., has filed a petition with the Public Service Commission of Indiana, for authority to increase fares on the Winona & Warsaw Railway, operated by it under lease. Tickets always have sold for 5 cents, or six for 25 cents between any

two points on the Winona & Warsaw Railway. It is asked that the rate be increased to 6 cents per ticket and the right to issue commutation books of twenty tickets each for \$1.

New York Inquiry Adjourned.—The hearing before the Public Service Commission of New York, in regard to the general condition of all the surface electric railways in New York City, was continued on Aug. 14 and then adjourned for a week. Some data were presented to the commission in answer to the various queries noted in the issue of Aug. 10, but as a rule the companies had found themselves unable to have the information ready, because of its amount and the shortage of accounting help.

Spokane Interurban Rates Increased.—The State Public Service Commission of Washington, in an order which it issued on July 30, upholds the advance in rates of the Washington Water Power Company, Spokane, on its interurban electric lines from Spokane to Medical Lake and Cheney, placing the passenger and freight rates on a parity with the government rates on steam roads. The new tariff calls for 3 cents a mile for passenger rates and a 25 per cent advance in freight rates. The changes just noted went into effect on Aug. 1.

Resort Line Allowed Increase.—An order permitting the Five-Mile Beach Electric Railway, Wildwood, N. J., to increase its fares from 5 cents to 6 cents has been filed by the Board of Public Utility Commissioners of New Jersey. This increase is in the nature of a war surcharge, to be abolished when conditions warrant a return to the original 5-cent fare. One of the main considerations of the commission in granting this increase was that this company serves coast resorts and does 75 per cent of its annual business in July, August and September. In the remaining months of the year the business is very light.

Preparing for the Unregulated Jitneys.—Paving the way for unregulated jitneys in Portland, Ore., Dan Kellaher, City Commissioner, recently introduced an ordinance repealing an ordinance passed by the Council requiring franchises for all automobile buses operated over definite routes. No vote was taken on the measure, although it is understood all members of the Council favor the repeal of the existing regulatory measure. Members of the United Motor Bus Company are still endeavoring to complete the organization of a company to operate 100 jitney buses, but no recent reports of progress have reached the members of the Council.

Mileage Rate Increase Allowed.—The Public Service Railroad, Newark, N. J., on Aug. 10, was permitted by the State Board of Public Utility Commissioners to charge 2½ cents per mile, and 10 cents minimum to apply to districts where the company operates on its private right-of-way. Between Chrome

Junction and Chrome, however, the fare will be 5 cents each way. The old rate was 2 cents a mile. The Public Service Railroad is included in the system of the Public Service Corporation of New Jersey, which also controls the Public Service Railway. The filing of the new schedule for the Public Service Railroad was referred to in the *ELECTRIC RAILWAY JOURNAL* of Aug. 10, page 263.

New Atlantic City Fares Suspended.—The Board of Public Utility Commissioners of New Jersey has announced that a hearing will be held on Sept. 24 in the matter of the increase of fare between Atlantic City and Longport by the Atlantic City & Shore Railroad. The commission has ordered the suspension of the increases in the existing fares until Oct. 13 next unless the board prior to this date determines that the increases are just and reasonable. The increase is from 5 cents to 6 cents. The same ruling prohibits the advance in the 100-trip books to Longport from Atlantic City from \$5.25 to \$7. The company planned to put the new fares into effect on Aug. 6.

Seven Cents in Hattiesburg.—The Hattiesburg (Miss.) Traction Company on Aug. 1 put a new schedule of increased fares into effect and, if the new standard of fares is maintained, motormen will continue to receive the increase of 2 cents an hour in their pay, which took effect on the same date. The cash fare rate is 7 cents, while books of twenty tickets are sold for \$1.25, or 6¼ cents a trip. The franchise of the Hattiesburg Traction Company does not provide any rate of fare, and to meet the rapidly mounting cost of labor and maintenance and construction material, the officials desired to put the increased rate of fare into effect without awaiting approval of the Commission of Mississippi.

Company Appeals Montreal Fare.—The Montreal (Que.) Tramways has appealed to the Public Utilities Commission of Quebec from the finding of the Montreal Tramways Commission fixing for the uniform tariff territory a cash fare of 6 cents plus 1 cent for transfers or five tickets for 25 cents with an extra cent for a transfer. There are also eight appeals by municipalities from the decision of the commission. According to T. I. Perron, representing the company, it will cost the company 6.3 cents for each passenger carried. The company wants a 7-cent cash fare with four tickets for 25 cents. The decision of the City Commission fixing the fares under the terms of the recently-enacted franchise was reviewed in the *ELECTRIC RAILWAY JOURNAL* for July 13, page 78.

New Buffalo-Niagara Falls Rates.—The International Railway, Buffalo, N. Y., has increased its rate of fare on the new fast service electric line between Buffalo and Niagara Falls. The round-trip fare of 60 cents has been discontinued and a one-way fare of 54 cents has been established. Passengers holding tickets valid on the old

Niagara Falls line will be charged an additional one-way fare of 19 cents on the new line. The new rates became effective on July 30. Fifty cents will be the fare charged by the International Railway on the old line between Buffalo and Niagara Falls and Buffalo and Lockport and Lockport and Niagara Falls after Aug. 22, according to a new tariff filed with the Public Service Commission. The one-way cash fare on these lines has been 35 cents.

Changes in Norfolk Southern Fares.

—Under a new rate scale on the electric division of the Norfolk Southern Railway, Norfolk, Va., which went into effect on July 28, the minimum fare is 10 cents instead of 5 cents. The fare to Virginia Beach, however, under the new rate, has been reduced to 42 cents each way, plus the war tax, making the round trip cost about 90 cents. The following statement was issued in connection with the new rate schedule: "The reduced fares on the electric division will become effective on July 28 as follows: Standard one-way fares, 2 cents per mile; minimum charge, 10 cents. Between Norfolk and Virginia Beach and Cape Henry and stations between Virginia Beach and Cape Henry—one-way fares—40 cents, via either route. Round-trip fares between Norfolk and Virginia Beach and Cape Henry via either route, 64 cents. Tickets on sale Saturday and Sunday, with final limit returning the following Monday."

Says Franchise Provisions Control.—The Hamilton (Ont.) Radial Railway, controlled by the Dominion Power & Transmission Company, Ltd., in a judgment handed down by the Railway Board on July 17, is allowed to increase its passenger rates to those enjoyed by the London & Port Stanley Railway (recently increased by an order of the board), subject, however, to the limitations created by the municipal franchise by-laws. The judgment states that this restriction is likely to prevent any relief whatever being granted the company. The company's application for an increase in rates was opposed by the city of Hamilton, the towns of Burlington and Oakville and other municipalities, because of agreements with the radial company as to rates. The Railway Board rules that it is bound by the municipal by-laws, and ought not to authorize any tariff which would create charges higher than those stipulated in the different municipal by-laws.

Los Angeles Fare Brief Filed.—City Attorney Stephens of Los Angeles, Cal., on July 27 on behalf of the municipality, filed with the State Railroad Commission his brief in the matter of the application of the Pacific Electric Railway for authority to increase fares. Evidence on this application was taken before members of the commission a short time ago. In his brief Mr. Stephens says: "It would seem to me that this whole proceeding should be considered one of apparent emergency, and if increases are granted, and, to be very frank with the commission, we must admit that the testimony as it now

stands would justify certain raises, that they be considered as temporary, and subject to change when the valuation is completed, operation more carefully checked, and economies put into operation." Mr. Stephens urges that the shipyard situation should be considered separate and apart from any other condition of the system, as this abnormal business has not required large expenditure of capital and is for a specific purpose, resulting from the existence of the war.

Hearing on Proposed Fare Increase.

—The Chautauqua Traction Company and the Jamestown, Westfield & Northwestern Railroad have filed with the Public Service Commission for the Second District of New York, a tariff showing changes in their passenger and commutation fares which they propose as effective on Aug. 23. Proposed new rates are substantially the same as those put into effect on June 10, 1918, when the companies claimed that control and operation were taken over by the Director General of Railroads in Washington. The Jamestown, Westfield & Northwestern Railroad proposes to discontinue the sale of 250-mile tickets, and 1000-mile tickets are to be advanced from \$17.50 to \$25. Tickets sold prior to Aug. 22 will not be honored except on payment of $\frac{1}{2}$ cent per mile on 250-mile tickets and $\frac{3}{4}$ cent a mile on 1000-mile tickets. Unused portions will be redeemed at the per-mile rate of the price paid. A complaint against the proposed increases has been filed by about 200 patrons. The commission will order a hearing on the proposed increases.

No Change in School Fares.—There will be no increase in the price of school tickets and special calendar monthly commutation book tickets by the Poughkeepsie & Wappingers Falls Railway, Poughkeepsie, N. Y., according to notice received by the Public Service Commission for the Second District. When the railway was granted permission to increase its rate of fare from 5 cents to 6 cents, it filed a tariff, which it proposed to put into effect on July 16, making increases in the price of school tickets and special commutation book tickets. The commission's order permitting the increase to 6 cents stated that the order did not relate to the school tickets or the special ticket books and the commission on its own motion suspended the increased rates, pending an investigation by Chairman Hill. There was one hearing at Poughkeepsie and an adjourned hearing was scheduled for July 24. It was not necessary to hold the July 24 hearing as the company notified the commission that it would accept existing rates for this class of passenger traffic and that it would amend the tariff on file with the commission.

Change in Peekskill Tariff.—The Putnam & Westchester Traction Company Peekskill, N. Y., filed with the Public Service Commission for the Second District of New York changes in its tariff rates, effective on July 23, as

follows: Local fares between any two stops within a specified zone reduced from 7 cents to 6 cents. Transfers established in connection with any fare paid from points within zone 1, all stops within Peekskill and to and including Williams Mills, at 2 cents each, good over the lines of the Peekskill Lighting & Railroad Company from the South Street switch to the New York Central depot, Locust Avenue and Montrose and points between. The Peekskill Lighting & Railroad Company proposed to put into effect on July 23 a change in its tariff regulations by which transfers were established at 2 cents each in connection with any fare paid within zone 1, all stops within Peekskill and on main line division to and including Locust Avenue, and on Verplanks division to and including Montrose, good over the lines of the Putnam & Westchester Traction Company to Williams Mills.

Fare Increase in Levis.—The Levis (Que.) County Railway applied recently to the four municipalities in which it operates for permission to increase its passenger fares, which were fixed by franchise and ratified by the Quebec Legislature. The fares which have been in force are: Cash fare, 5 cents; unlimited tickets, six for 25 cents; scholars' tickets, fifty for \$1.25. The company applied for the following new rates: Cash fare, 10 cents; unlimited tickets, twelve for \$1; workmen's tickets, sixteen for \$1; children not in arms and scholars under sixteen years of age, fifty tickets for \$1.50. An agreement has now been reached under which the cash fare is advanced from 5 cents to 10 cents. Unlimited tickets will be sold, eight for 50 cents, or fifty for \$3, instead of six for 25 cents as heretofore. Children, not in arms and under twelve years of age will be charged a cash fare of 5 cents or ten tickets for 25 cents; scholars will be sold fifty tickets for \$1.50.

New Haven Ordered to Remove Discrimination.—In the case of Herman W. Gersch vs. the New York, New Haven & Hartford Railroad, the Interstate Commerce Commission has found that the maintenance of commutation fares and special fares for school children between Providence, R. I., and points on the company's Bristol, R. I., branch lower than between Providence and Touisset, South Swansea and Fall River, Mass., for like distances, results in undue prejudice to Touisset, South Swansea and Fall River. It has therefore ordered the company to remove, on or before Sept. 2, and thereafter to abstain from practicing, the undue prejudice found to exist. This order is to continue in force for a period of not less than two years from the date it is to take effect. The stations in question are on defendant's Providence, Warren & Bristol branch line, a standard gage railroad operated by electricity and extending from Providence to Warren, R. I., where it forks into two branches, one to Bristol, and the other through East Warren.

Personal Mention

M. J. Fox has been appointed purchasing agent of the Columbus (Ga.) Railroad to succeed D. A. Turner.

R. S. Walker has been appointed treasurer of the Pacific Coast Railway, Seattle, Wash., to succeed J. W. Smith.

William Bennetts has been appointed electrical superintendent of the Western Light & Power Company, Boulder, Col., vice Harley Hard, resigned.

Fred W. Murphy has resigned from the position of master mechanic and electrical engineer of the Chicago, Ottawa & Peoria Railway, Ottawa, Ill., to accept the position of master mechanic of the Rockford & Interurban Railway, Rockford, Ill.

Edward L. Moreland, a member of the firm of D. C. & Wm. B. Jackson, Boston, Mass., has recently been called for by General Pershing and has been commissioned a captain in the engineer officers' reserve corps. Mr. Moreland expects to go abroad shortly.

Frank W. Laas has been appointed superintendent of the Western Light & Power Company with headquarters at Boulder, Col. Mr. Laas was formerly superintendent of power of the Iowa Railway & Light Company, Iowa Falls Electric Company, and Iowa Electric Company, Cedar Rapids, Ia.

Clifton Reeves, representative of the United States Department of Labor, who has been in Buffalo and other cities investigating electric railway problems for the government, has resigned, to accept a position to look after the labor interests of the Curtiss Aeroplane & Motor Corporation in Buffalo.

H. U. Wallace for the last six years vice-president and general manager of the Western Light & Power Company with headquarters at Boulder, Col., has resigned and accepted appointment as major in charge of engineering and construction, Quartermaster's Department, with headquarters at Washington, D. C.

James Lukey, for the last five years inspector and chief inspector for the Wichita Railroad & Light Company, Wichita, Kan., has been appointed master mechanic for that company to take the place of J. A. Lawhorn, who has resigned to enter other work. Prior to 1913 Mr. Lukey served as night carhouse foreman for the Kansas City (Mo.) Railway.

I. N. Randall has resigned as assistant general manager of the Ocean Shore Railroad, San Francisco, Cal., to accept appointment as assistant in transportation, bureau of markets, United States Department of Agriculture, and has been assigned to the Pacific Coast with headquarters in San Francisco, having charge of all transportation matters for the Department

of Agriculture in the States of California, Oregon, Washington, Idaho, Utah, Nevada and Arizona.

C. T. Jones, a civil engineer, has been appointed inspector in the office of the Supervisor of Public Utilities of the city of Dallas, Tex., and has been assigned to the duty of supervising the checking of the number of cars in operation, number of passengers carried, number of passengers provided with seats, etc. These data are desired by the office of the Supervisor of Public Utilities to be used as a basis for intelligent action on complaints regarding service on the part of patrons.

H. A. Bennett, superintendent of employment of the Bay State Street Railway, Boston, Mass., since September, 1917, has been appointed general claim agent of that company to succeed W. A. Driscoll, who has resigned and entered the employ of the Hugh Nawn Construction Company as purchasing agent with headquarters at Philadelphia. Mr. Bennett is very well known in electric railway circles. He was long connected with the Fitchburg & Leominster Street Railway at Fitchburg, Mass., the service of which he entered in 1898 as carhouse foreman and dispatcher. He has always taken an active interest in the work of the American Electric Railway Claim Agents' Association and in 1911 was elected president of that association.

D. A. Hegarty has been elected vice-president of the Western Light & Power Company with headquarters at Boulder, Col., succeeding H. U. Wallace, resigned. Mr. Hegarty was formerly vice-president and general manager of the Little Rock Railway & Electric Company, Little Rock, Ark.; general manager of the New Orleans Railway & Lighting Company, New Orleans, La., when that company was operated by Ford, Bacon & Davis; general manager of the Houston Lighting & Power Company, and since last year has again been in the service of Ford, Bacon & Davis, working on appraisals, reports, increased fare and rate ences. Mr. Hegarty has taken an active part in the work of the American Electric Railway Transportation & Traffic Association, of which he was formerly president, and has served as a member of a number of committees of the National Electric Light Association and also of the Association for Municipal Improvements.

Dan G. Fisher, editor of *O. K.'d Copy*, first vice-president of the Dallas Advertising Club, and district vice-president of the Associated Advertising Clubs of the World, on Aug. 6 was presented with a gold emblem of the Associated Advertising Clubs of the World by Mayor Lawther of Dallas,

Tex., on behalf of the members of the club following a speech in which the Mayor told of Mr. Fisher's worth as a citizen and club member. Mr. Fisher was recently elected district vice-president of the Associated Advertising Clubs of the World at its San Francisco convention, and his election to that office was a distinct honor conferred upon the Dallas Advertising League. Dan Fisher is an all-around good fellow. He is well known to electric railway men throughout the entire United States but more particularly to electric railway and electric light and power men in the Southwest. In 1914 he was president of the Southwestern Electrical & Gas Association. Mr. Fisher was long connected with the electric railways controlled by the J. F. Strickland Company, which include the Dallas-Sherman, Dallas-Waxahachie and the Dallas-Waco Lines. He entered business in Dallas in the circulation department of the *Dallas Times-Herald*. While connected with the Strickland lines he was in charge of the publicity of the Dallas Power & Light Company, the Dallas Railway, the Texas Electric Railway and the Texas Power & Light Company. In 1914 he was made assistant general manager of the Strickland lines. In addition to being a former president of the Southwestern Electrical & Gas Association Mr. Fisher also served for several years as secretary of that association. *O. K.'d Copy*, the publication of the Dallas Advertising League, for Aug. 6 was a "Dan-fisher Number," printed "just to show you, Dan, that we issue *O. K.'d Copy* without a real editor occasionally." Of Dan Fisher it is said by those who know him best that "with ambitions that are lofty and attainments far beyond those of the average man, he is as plain as an old shoe."

Obituary

Edgar R. Giaque, assistant superintendent of the Jefferson and allied lines of the Detroit (Mich.) United Railway, is dead. Mr. Giaque began his service with the company on Nov. 24, 1911, being assigned to the Clark Avenue carhouse.

Ray Tompkins, for seventeen years president of the Elmira Water, Light & Railroad Company, Elmira, N. Y., is dead. Mr. Tompkins was one of the leading bankers of Elmira, the head of a large wholesale business, a director in many local enterprises and the moving spirit in civic and charitable work. He died after an illness of many months.

George G. Caldwell, for a number of years construction engineer for H. M. Byllesby & Company, Chicago, Ill., died of heart trouble on July 27 at Ottumwa, Iowa, where he was engaged on special construction work for the Ottumwa Railway & Light Company.

Construction News

Construction News Notes are classified under each heading alphabetically by States. An asterisk (*) indicates a project not previously reported.

Track and Roadway

Connecticut Company, New Haven, Conn.—The engineering staff of the Connecticut Company is busily at work on plans for the extension of the company's tracks on Boston Avenue, Bridgeport, which will give a direct route from the North End and from Stratford to the plant of the Remington Arms Company.

Jacksonville (Fla.) Traction Company.—The Jacksonville Traction Company is extending its line from the borders of Camp Johnston into the reservation to a point still to be decided upon.

Gary (Ind.) Street Railway.—Work will soon be begun by the Gary Street Railway on the construction of its Buchanan Avenue extension.

Indianapolis Traction & Terminal Company, Indianapolis, Ind.—The Board of Public Works has decided to issue an order to the Indianapolis Traction & Terminal Company to lay a single-track extension on North Illinois Street between Thirty-ninth and Forty-sixth Streets and grant the company a year to build it if the company will fill and curb an excavation made for double tracks.

Louisville (Ky.) Railway.—T. J. Minary, president of the Louisville Railway and the Louisville & Interurban Railroad, in a recent statement said that military activities at West Point and Stithton, Ky., would probably occasion no extension of the lines of the companies from Orell, Ky., to Hardin County.

St. Louis, Mo.—Preparations are being made to operate trolley cars over the new Free Bridge. The Chamber of Commerce of East St. Louis is interested. The franchise has been offered to the East St. Louis Interurban Electric Railway by the Municipal Bridge Commission but has not been formally accepted by the company. Overhead wires are being installed. It is understood that the plan has been suggested of using two one-man cars to furnish service at first.

New Jersey & Pennsylvania Traction Company, Trenton, N. J.—The City Commission of Trenton, N. J., has granted permission to the New Jersey & Pennsylvania Traction Company to run a spur into the terminal yards at Warren and West Hanover Streets, Trenton, so as to keep the large Princeton cars off the streets in discharging and admitting passengers.

Under the present arrangement it is impossible to comply with the so-called four-minute law prohibiting the halting of trolley cars on public thoroughfares.

New York (N. Y.) Municipal Railway Corporation.—The Public Service Commission for the first district of New York, has received bids for the construction of station finish for two stations on the Broadway subway, Manhattan, at Forty-ninth and Fifty-seventh Streets and Seventh Avenue, and also for a supply of untreated ties and timber for use on the rapid transit railroads. The unofficial totals presented show that A. W. King, at \$153,262, was the low bidder on station finish work, while J. H. Burton & Company, New York, with a total of about \$236,000, were the only bidders on orders for untreated ties and timber.

Levis (Que.) County Railway.—The Levis County Railway has awarded a contract for rebuilding its electric railway system to C. H. Jackson & Company, Quebec, and the National Cartage & Supply Company, Limoilou.

Texas Electric Railway, Waco, Tex.—Announcement is made by the Texas Electric Railway, that extensions of the lines will be made in Waco immediately that will give a line to Camp McArthur, the army cantonment near that city. The first line to be built will enter the government property in that section of the camp known as the replacement camp. The initial improvement calls for the laying of 7000 ft. of track and will cost approximately \$25,000. Later other lines will be built inside the camp boundaries.

Municipal Railway, Tacoma, Wash.—The Council of Tacoma recently accepted a proposition by C. C. Miller, president of the Commercial Lumber Company, to complete the Lincoln Avenue extension of the municipal car line with \$500 to be advanced by the company. The \$500 will be credited on freight to be hauled by the city for the company. The line will be completed to extend to the new mill of the lumber company on the Commercial Waterway.

Shops and Buildings

Sheffield (Ala.) Company.—This company reports that an addition will be built to its workshop.

Sand Springs Railway, Tulsa, Okla.—A report from the Sand Springs Railway states that the company expects to place contracts within the next ten weeks for the construction of a new station at Tulsa.

Schuylkill Railway, Girardville, Pa.—A report from the Schuylkill Railway states that the company will construct an addition to its carhouse.

Texas Electric Railway, Dallas, Tex.—The Texas Electric Railway has completed a new passenger station at Waxahachie. The station is modernly equipped to care for passenger, express and baggage business.

Petersburg, Hopewell & City Point Railway, Petersburg, Va.—This company reports that a contract has been placed for the construction of an extension to its carhouse.

Power Houses and Substations

Sheffield (Ala.) Company.—This company reports that it expects to purchase a new ash-handling outfit. A new 500-kw. rotary and one 300-kw. motor-generator set have been purchased by the company.

Arkansas Valley Railway, Light & Power Company, Pueblo, Col.—A new transmission line will be built by the Arkansas Valley Railway, Light & Power Company to two new alfalfa mills being erected in the Arkansas Valley district, between Ordway and Crowley. Energy will also be supplied to several ranches on the line.

Dallas Power & Light Company, Dallas, Tex.—A new brick and concrete addition to its power house, to cost about \$15,000, will be built by the Dallas Power & Light Company, which supplies energy to the Dallas Railway.

Washington Water Power Company, Spokane, Wash.—That the Washington Water Power Company is to be called upon to expend \$750,000 on its Long Lake plant to meet the demands of the Chicago, Milwaukee & St. Paul Railway for power was information given the State Public Service Commission recently at the valuation hearing. D. L. Huntington, the president, said: "Verbal notice has been given to the company that the International Power Company, which buys power for the Milwaukee electrification system, will exercise its option for an additional 5000 hp., making a total of 15,000 hp. in all. The power company will have to meet this demand when it is made formally, although the company, while paying for the first 5000-hp. power unit, is not using any now."

Charleston-Dunbar Traction Company, Charleston, W. Va.—Work is under way on the excavations for the foundations of the new power house of the Charleston-Dunbar Traction Company at Dunbar, to replace the one destroyed by fire last December. The new building will have a floor space of 50 ft. x 92 ft., being considerably larger than the former power house. The new power house will be located on the site of the old one, immediately adjoining the carhouse, from which it will be separated by a fire wall.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS

FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

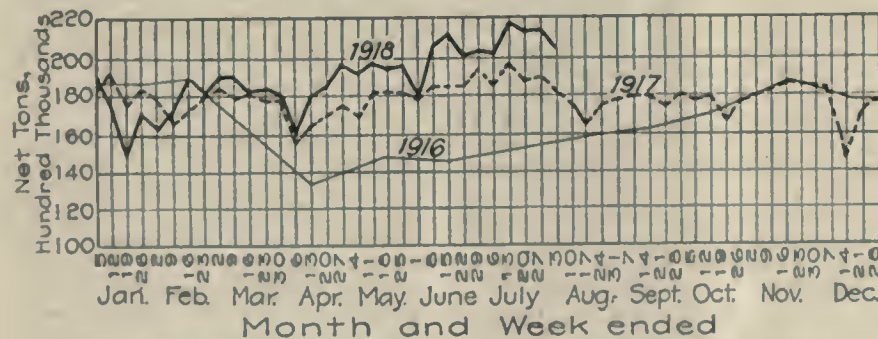
ROLLING STOCK PURCHASES • MARKET QUOTATIONS • BUSINESS ANNOUNCEMENTS

Coal Production Still on the Decrease

Bituminous However, for Week Ended Aug. 3 Shows 14.3 per Cent Increase Over 1917

During the week ended Aug. 3 the output of bituminous coal not only decreased more than 3 per cent, but recorded the third successive week of decreased production, according to the regular weekly report of the U. S. Geological Survey. Production of bituminous coal (including lignite and coal coked) during the current week is estimated at 12,422,000 net tons, a decrease compared with the week preceding of 398,000 net tons, but an increase over the same week of 1917 of 1,563,000 net tons or 14.3 per cent.

The average production per working day during the week of Aug. 3 is estimated at 2,070,000 net tons as compared with 2,137,000 net tons during the week of July 27 and 1,810,000 net tons during the week of Aug. 3, 1917.



ESTIMATED AVERAGE TOTAL PRODUCTION PER WORKING DAY OF BITUMINOUS COAL, INCLUDING COAL COKED

Shipments during the past week decreased from all districts with the exception of Cumberland-Piedmont and Somerset, Tennessee and Kentucky and Iowa, Texas and the Southwest States. The increase from the Cumberland-Piedmont district was 7 per cent, from the Tennessee and Kentucky district 5 per cent and from the district including Iowa, Texas and the Southeast States 4.8 per cent. Material decreases in shipments for the week were as follows:

Western Pennsylvania 0 per cent, Ohio 3.6 per cent, the district including northeastern Kentucky, high volatile of southwest Virginia and Virginia anthracite fields 7.8 per cent, southwest Virginia 16.8 per cent, Alabama 17 per cent and the district including Illinois, Indiana and western Kentucky 6.1 per cent.

Anthracite shipments during the

week ended Aug. 3 decreased 1310 carloads or 3.2 per cent, the total movement amounting to 39,632 carloads.

Expeditionary Force to Get Rails and Cars

Orders for This Equipment Distributed Among Five Rail Mills and Eight Car Builders

The Director of Steel Supplies, through the steel products committee of the Iron and Steel Institute, it is learned, has distributed an order for 200,000 tons of 80-lb. type "B" rails among the manufacturers for shipment to the United States Expeditionary Force in France. The specifications call for shipment of 40,000 tons per month to begin immediately. Bessemer or open-hearth rails may be shipped at the option of the mill. The price has not been fixed, but will be adjusted after the government and rail mills have come to an agreement.

Conditions in Iron and Steel Scrap Market

Reasons Why Some Sellers May Not Receive Maximum Prices Set by Government

The supply of scrap iron and steel has not materially increased. Sellers such as traction companies, however, may not be able to obtain the maximum prices set by the government owing to the conditions obtaining in the yards of the scrap dealers. Labor is scarce and consequently it is very difficult to grade the material in the yards. Because of the different classifications of scrap and the accompanying prices it is more necessary than ever.

Supplies in the yards have accumulated and consequently dealers in scrap are not so anxious to increase their holdings at the maximum prices. If a sufficient and satisfactory supply of labor could be had at the scrap yards it seems probable that there would be greater competition for the miscellaneous scrap, such as accumulates around carhouses and shops.

At any rate close market observers are firmly of the opinion that the supply of scrap will diminish as time goes on. In that event the dealer demand for scrap iron and steel should pick up and naturally prices with it.

Steel Trolley Poles in No Great Demand

Market Quiet and Price Revisions Infrequent—Five per Cent Advance in a Month

Just now, in common with other equipment, steel trolley poles are not being bought by the traction lines in any surprisingly large quantities. In other words, the market is very quiet. It appears inquiries for this material are also below normal as there is very little new construction work under way or contemplated. Deliveries are very good; that is to say, shipments out of stock can be made in thirty days. Prices have changed little within a year. From 1915 to 1917 there was an advance of about 37 per cent. Six months ago steel trolley poles were increased 1 cent a pound. Within a month 5 per cent was added.

Leading manufacturers report they are not having any trouble getting steel material. It comes through from the mills in fairly good time and in adequate amounts to fill orders. Of course, each producer and also his selling agents must sign the War Industries Board's raw materials pledge.

Time to Lay In Stock of Gear Cases

Conditions in Iron and Steel Market May Make It Difficult to Get Delivery Later

To what extent electric cars may have to be operated for shorter or longer periods of time without gear cases is as yet merely a matter of speculation. Certain it is, however, that unless road operators face conditions squarely and anticipate their requirements in a way designed to take care of the persisting shortage of raw material and other delivery delaying factors they may find the stock exhausted and the demands from the repair shops insistent.

The condition of the raw material market to-day is worse when demand is considered than it ever has been in the history of the industry. Even with the tremendous volume of iron and steel that the mills are now turning out the country faces a shortage of this material. All industries not essentially of a war nature are being made to curtail through inability to get iron and steel, in some cases to the extent of 100 per cent. In order to get iron and steel now a manufacturer must show what the material is to be used for ultimately.

Some manufacturers have a supply of steel on which they can draw for ordinary commercial requirements, but after this stock is gone it will not be easy to convince the government that a further stock is necessary.

While gear cases have been made the theme of these remarks the same statements will apply equally well to other products made of iron and steel. The wise manager therefore will endeavor to anticipate his requirements as well as prepare to repair such parts as are capable of being repaired. With the winter season coming on when the wear and tear on the system is greater the necessity for quick action looms up larger to-day than it has in previous months.

Hoist Manufacturers Discuss War Service

Plants Heavily Booked for Government Orders, and Problem of Securing Raw Material Becomes Critical

The Electric Hoist Manufacturers' Association held its June meeting at Montour Falls, N. Y., where the members of the association were the guests of the Shepard Electric Crane & Hoist Company. The general topic of the meeting was war service, and the general discussion was directed along lines for co-ordinating the experience and facilities of the electric hoist manufacturers to be of the most direct and efficient service to the government for war requirements. The electric hoist manufacturers are heavily booked up on government orders for war purposes, and the problem of securing raw material sufficiently in advance to meet

government requirements promptly has become a critical one. The consensus of opinion of the electric hoist manufacturers is that government orders for war purposes should take precedence over all other orders, and if war requirements call for the complete output of all of the manufacturers of electric hoists, it will be desirable to refuse all other business.

Official Copper Price Continued at 26 Cents

Buyers May Make Contracts for Delivery After Nov. 1 on Basis of Delivery Price

At the conference of copper producers with the price fixing committee of the War Industries Board on Aug. 7 the official price of 26 cents for copper was continued in effect until Nov. 1. The producers, it is understood, had made representation for a higher price, while the consumers showed the dissatisfaction that would result from such frequent changes in the official price.

It was stated at the meeting by Mr. Brookings that the government had sufficient copper in sight for its needs. In such a case it was recognized as being useless to urge a higher price on the basis of greater production.

Also producers may accept orders for delivery after Nov. 1 at the price ruling on delivery. This is expected to stop the slowing up in buying a few weeks before to a price-fixing meeting.

It would not be unreasonable to suppose that this order will be passed on to the consumer of copper products to a much larger extent than is now the case. In the past two years a number of manufacturers have taken the position that the contract price is that ruling at the time of delivery. This has not been done by the majority of manufacturers, however.

A number of manufacturers in the first few days in August withdrew their prices owing to an expected change in the price of copper. Whether these concerns will continue to give only day-by-day prices or will quote as of delivery or will issue new prices is not known.

As soon as the government announced its decision copper buyers came into the market and orders for a considerable quantity of the metal were placed.

The conditions imposed by the government are: First, that the producers of copper will not reduce the wages now being paid; second, that they will sell to the United States government, to the public in the United States, and to the Allied governments at not above the maximum price; third, that they will take the necessary measures, under the direction of the War Industries Board, in the distribution of copper to prevent it from falling into the hands of speculators, who might increase the price to the public; and, fourth, that they will pledge themselves to keep up the production of copper to meet war needs.

Rolling Stock

Radford (Va.) Water Power Company reports that it expects to purchase one single-truck pay-as-you-enter one-man car.

Columbus (Ga.) Railroad advises the ELECTRIC RAILWAY JOURNAL that the order recently placed for six Birney cars and stipulating shipment some time in November, has been canceled.

Seattle (Wash.) Municipal Street Railway reports that it has ordered twenty-five double-truck four-motor passenger cars. In addition the railway furnishes the following specifications on six one-man Birney cars ordered on July 19. These are the specifications required of the car builders. However, stock cars conforming substantially to these specifications will be acceptable by the railway, because immediate delivery is desired.

Number of cars ordered.....6
Name of road...Seattle Municipal Railway
Date order was placed.....July 19, 1918
Date of delivery.....2 cars Sept. 1, 4 cars Nov. 1, 1918
Builder of car body.....American Car Co.
Type of car...One-man, atandard Birney
Seating capacity30
Weight13,000 lb.
Length over all.....27 ft. 9 1/2 in.
Truck wheelbase8 ft. 0 in.
Width over all.....8 ft. 0 in.
Height, rail to trolley base...9 ft. 9 in.
BodySemi-steel
Interior trim doors-sash, moldings, etc., Light mahogany
RoofArched
Air brakesWestinghouse
Armature bearings.....Sleeve
AxlesHammered steel—Brill
Bumpers...3-in. 4-16 channel iron buffer-shield of No. 16 sheeted. Full width, round corners
Car signal system...Faraday or equal, one 9-in. foot gong each end
Car trimmings...Light mahogany and bronze
Control...Westinghouse, 506-A, 2 motors, K-10 double-end control
Curtain fixtures.....Curtain Supply Co.'s or equal
Curtain materialPantasote
Designation signs...Hunter's illuminated car sign, gas or equal
Door operating mechanism: Deadman-control, Westinghouse, pneumatic control, motorman's valve
Fare boxes.....Furnished by purchaser
Fenders on wheelguards...Made in municipal carhouses
Gears and pinions.....Barnes' process, or equal
Hand brakes...Pittsburgh drop-handle—steel tubing, or equal
Heater equipment.....Consolidated Car Heating Co. or Peter Smith
HeadlightsGolden Glow No. 95m
Journal bearings.....Gurney ball bearing
Motors, type and number...Westinghouse, 506-A-2, inside hung
Paint, varnish or enamel...Best according to standard
Sanders.....Controlled through air-brake equipment
Sash fixtures.....O. M. Edwards, 13 1/2 M. D-1 sash lock or equal
Seats.....Hale & Kilburn, Walkover No. 300, 37-in. long, or equal
Seating material.....Hardwood slat seat, match interior
Slack adjuster.....Type B, automatic
Trolley treads.....Feralun 3 in. wide
Trolley catchers or retrievers...Earl catcher
Trolley wheels or shoes...Wheels No. 6177 type, 6-in. wheel
Trucks.....Brill spec. 78-M-1
Ventilators.....Utility Ventilator Co.'s
Wheels...Cast chilled, 24-in. dia., 3-in. tread
Special devices, etc...Two No. 4 semaphore lenses on both ends; G. E. Co. Keyless sockets, No. 60019; cars built in accordance with latest Nat. Code

Connecticut Company, of New Haven, Conn., will purchase through the United States government seventy new pay-as-you-enter type electric cars to cost \$10,000 apiece. The government will

pay for the cars and the traction company will rebuy them from the government in five years.

Trade Notes

Weiss Switch Lock Company, Springfield, Ill., has moved its offices from 312 South Fifth Street to 600 East Capitol Avenue.

American General Electric Edison Corporation of China, Schenectady, N. Y., has filed notice of an increase in its capital from \$500,000 to \$1,000,000, to provide for business extension.

Electric Process Company of Wilmington, Del., has been incorporated by M. L. Rogers, L. A. Irwin and W. G. Singer of Wilmington, Del. The company proposes to deal in steel, iron, etc.

E. P. Dillon, manager of the power division, New York office of the Westinghouse Electric & Manufacturing Company, has resigned to become general manager of the Research Corporation of New York.

American Gear Manufacturers' Association will hold its semi-annual meeting at the Onondaga Hotel, Syracuse, N. Y., on Sept. 19, 20 and 21. Announcement of the program will be given in a later issue.

Root Spring Scraper Company, Kalamazoo, Mich., has just shipped to the St. Louis Car Company a complete equipment of No. 2 snow scrapers and

Root spring fenders for the thirty cars which that company is building for the Saginaw Bay City Railway. This company and others allied with the Michigan United Railway have replaced all their snow sweeper equipments with Root scrapers and have had gratifying success.

Drew Electric & Manufacturing Company, Indianapolis, Ind., has received through its Chicago representative, Holden & White, Inc., what is probably the largest order for overhead frogs ever recorded. This is an order from the Chicago Surface Lines for 2500 overhead malleable-iron frogs for immediate delivery. The Drew Company is shipping a large amount of this from Indianapolis stock. During July, the Chicago Surface Lines also ordered 1000 malleable-iron overhead crossings.

Trumbull Electric Manufacturing Company, Plainville, Conn., has this week advised the trade that it has permanently discontinued the manufacture of armored cable, armored cord and flexible steel conduit, its schedules "X" and "Y." This step, the company states, was taken in order that it might devote its entire energy to other lines, including a large amount of government business, both direct and indirect, as well as its "safety service" externally operated line of knife switches. In taking this step the company has canceled all orders for the above materials now in its works, and no further orders, of course, will be taken.

New Advertising Literature

Trolley Supply Company, Canton, Ohio: A folder descriptive of its Simplex trolley base.

Beardslee Chandelier Manufacturing Company, Chicago, Ill.: Circular entitled "Better Lighting for Better Results" that describes the Denzar lighting unit for lighting factories, stores, shops, halls, hotel lobbies, hospitals, churches, public buildings, office buildings, apartment houses and schools.

Westinghouse Electric & Manufacturing Company: Catalog on wiring devices and carbon circuit breakers. In this 224-page, 8½-in. x 11-in. catalog are listed fuses, knife switches, service switches and boxes, solderless connectors, disconnecting switches, instrument switches, safety switches, safety panelboards, safety floor boxes and carbon circuit breakers, part of which have previously been listed in the company's old sectional catalog No. 3001.

E. I. du Pont de Nemours & Company, Wilmington, Del.: "Blaster's Handbook," in pocket form, with information regarding the proper explosive to use, the quantity, the method of loading and firing. It is profusely illustrated and contains charts and diagrams with references to other handbooks on special topics issued by the same company, among them "Hole and Post Holes," "Shale and Clay Blasting," "Roadbuilding and Maintenance."

NEW YORK METAL MARKET PRICES

	Aug. 7	Aug. 14
Copper, ingots, cents per lb.	26	26
Copper wire base, cents per lb.	29.25	29.25
Lead, cents per lb.	8.05	8.05
Nickel, cents per lb.	40	40
Spelter, cents per lb.	45 to 8.53	8.90 to 9.00
Tin, Chinese, cents per lb.	92	90 to 90.5
Aluminum, 98 to 99 per cent., cents per lb.	133.00	133.00

* No Straits offering. † Government price in 50-ton lots or more, f. o. b. plant.

OLD METAL PRICES—NEW YORK

	Aug. 7	Aug. 14
Heavy copper, cents per lb.	23½ to 24½	23.50 to 24.50
Light copper, cents per lb.	20 to 20½	20 to 21.50
Red brass, cents per lb.	21 to 22	21 to 22
Yellow brass, cents per lb.	14½ to 15	15 to 15.50
Lead, heavy, cents per lb.	7 to 7½	7.12 to 7.50
Zinc, cents per lb.	5½ to 5½	5½ to 5½
Steel car axle, Chicago, per net ton	\$41.52	\$41.52
Old carwheels, Chicago, per gross ton	\$29.00	\$29.00
Steel rails (scrap), Chicago, per gross ton	\$34.00	\$34.00
Steel rails (relaying), Chicago, gross ton	\$60.00	\$60.00
Machine shop turnings, Chicago, net ton	\$16.25	\$16.25

ELECTRIC RAILWAY MATERIAL PRICES

	Aug. 7	Aug. 14
Rubber-covered wire base, New York, cents per lb.	30 to 37	30 to 37
Weatherproof wire (100 lb. lots), cents per lb., New York	32.40	32.40
Weatherproof wire (100 lb. lots), cents per lb., Chicago	37.50 to 37.72	33.00 to 37.72
T rails (A. B. C. E. standard), per gross ton	\$70.00 to \$80.00	\$70.00 to \$80.00
T rails (A. B. C. E. standard), 100 to 500 ton lots, per gross ton	\$67.50	\$67.50
T rails (A. B. C. E. standard), 500 ton lots, per gross ton	\$62.50	\$62.50
T rail, high (Shanghai), cents per lb.	4½	4½
Rails, ridge (grooved), cents per lb.	4½	4½
Wire nails, Pittsburgh base, cents per lb.	3½	3½
Railroad spikes, drive, Pittsburgh base, cents per lb.	4½	4½
Railroad spikes, screw, Pittsburgh base, cents per lb.	8	8
Tie plates (flat type), cents per lb.	11½	11½
Tie plates (thrust type), cents per lb.	2	2
Tie rods, Pittsburgh base, cents per lb.	11½	11½
Flah plates, cents per lb.	11½	11½
Angle plates, cents per lb.	11½	11½
Angle bars, cents per lb.	11½	11½
Ball bolts and nuts, Pittsburgh base, cents per lb.	4.90	4.90
Steel bars, Pittsburgh, cents per lb.	5	5
Sheet iron, black (24 gage), Pittsburgh, cents per lb.	4.90	4.90
Sheet iron, galvanized (24 gage), Pittsburgh, cents per lb.	5.80	5.80
Galvanized twisted wire, Pittsburgh, cents per lb.	4.55	4.55

	Aug. 7	Aug. 14
Galvanized wire, ordinary, Pittsburgh, cents per lb.	3.95	3.95
Car window glass (single strength), first three brackets, A quality, New York, discount	80%	80%
Car window glass (single strength), first three brackets, B quality, New York, discount	80%	80%
Car window glass (double strength, all sizes AA quality), New York discount	82 & 3%	82 & 3%
Waste, wool (according to grade), cents per lb.	11½ to 22	11½ to 22
Waste cotton (100 lb. bale), cents per lb.	13 to 13½	13 to 13½
Asphalt, hot (150 tons minimum), per ton delivered	\$38.50	\$38.50
Asphalt, cold (150 tons minimum, pkgs. weighed in, F. O. B. plant, Maurer, N. Y.), per ton	\$42.50	\$42.50
Asphalt filler, per ton	\$45.00	\$45.00
Cement (carload lots), New York, per bbl.	\$3.20	\$3.20
Cement (carload lots), Chicago, per bbl.	\$3.34	\$3.34
Cement (carload lots), Seattle, per bbl.	\$3.68	\$3.68
Lamp oil raw, 5 bbl. lots, New York, per gal.	\$1.86	\$1.86
Lamp oil (bleed), 5 bbl. lots, New York, per gal.	\$1.88	\$1.88
White lead (100 lb. keg), New York, cents per lb.	10½	10½
Tar (141 lbs.), New York, cents per gal.	63	63

* Government price † These prices are f. o. b. works, with loading charges extra

"Never Any Trouble from Peacock Brakes"



The Eccentric
Drum

said the master mechanic of the Tidewater Power Company at Wilmington, N. C., which has fifty-four Peacocks.

"They're used all the time on our city cars.

"An inspector goes over the brake chains and brake every morning and then I give the outfit a try myself.

"It's easy to play safe, and the Peacock Brake helps us do it.

"The Peacock Brake is the Best Ever Struck."

National Brake Company
Buffalo, N. Y.

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Industrial Plants and Buildings, Steam Power Stations,
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ELECTRIC RAILWAY ENGINEER

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tion of the Electric Railway Journal would be appreciated.

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The Thermit Process of Track Welding

Makes Permanent Joints

Costs Less in the End



The Thermit Process is the only method of rail welding which solves the problem by eliminating the joint, making a perfect weld between the rail heads. This method is much superior, both mechanically and electrically, to any other kind of joint. It makes a permanent union, which will last as long or longer than the rails proper. It has an electrical conductivity equal to the rail itself. Failure of a joint to conduct ALL the electricity to the power house means loss of energy, electrolysis and interference with nearby low voltage circuits.

Our Catalog No. 12, free on request, describes the Thermit insert rail weld and shows why this process is not only the best solution of the rail joint problem, but is also the least expensive method in the end, making due allowance for all considerations entering into track welding.

*May we send you this catalog, or better still,
may we discuss track welding with you?*

METAL & THERMIT CORPORATION

Successors to Goldschmidt Detinning Co. and the Goldschmidt Thermit Co.

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SAN ANTONIO PUBLIC SERVICE COMPANY'S
LINES ARE PROTECTED BY

"D & W"

The Best in Fuses
Like the Best in Insulation

The San Antonio Public Service Company uses D & W non-refillable 6 amp. volt fuses for its compressor circuit because it wants an absolutely reliable fuse for this critical circuit.

San Antonio cars are carrying 50 to 60 per cent. more business than ever before. They can't afford to put up with fuses that vary in capacity, going off either too early or too late to save the equipment.

The absolute uniformity in current carrying capacity of the "D & W" fuse makes it the logical protector for the careful operator.



D & W FUSE CO.

PROVIDENCE, R. I.



This Handsome Car Is One of Fourteen Wired in DURADUCT

(Reg. U. S. Patent Office)



For the West Penn Railways of Connellsville, Pa., whose progressiveness in car standards generally, is self-evident from this picture.

Duraduct, as evidenced by such installations as this, is not merely a conduit for the protection of wiring on old cars. Its qualities of flexibility, lightness, waterproofness, resistance to fire and ease of installation make it just as applicable on the most modern cars of the one-man Safety Cars, on which Duraduct is *standard*, to the finest interurbans.

Thousands of cars are already wired in Duraduct. We should be glad to add your cars to the list. Just order enough for one car as a beginning!

TUBULAR WOVEN FABRIC COMPANY
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Modernizing Fare Collection on the Hudson & Manhattan Railroad

After three years of careful study of various fare collection methods which included practical tests on various makes of station fare collection boxes, this company replaced its ticket choppers with

JOHNSON FARE BOXES

These boxes are operated electrically by a motor enclosed in the round pedestal base.

As the fare at some points is 5 cents and 7 cents at others, boxes having different combinations are installed as required.

The deposited coins remain in plain sight of the operator and the passenger for an appreciable time as they pass on to the continually moving horizontal surface on their way to the counting mechanism.

Should any dispute arise as to the value of the coins deposited, the operator can stop the horizontal surface instantly by pressing a button.

The coins drop into a special self-locking container enclosed in the pedestal base. An employee collects and exchanges the containers once a day.

The operation of removing the container automatically revolves its top and locks it shut. At the same time the swinging door in the pedestal base is held locked open and can only be released by the insertion of an empty container. A container accidentally locked *en route* from the office cannot be inserted. The locked containers can only be opened by a key which is never allowed to leave the treasurer's office.

The key for the pedestal door cannot be withdrawn after the latter has been opened a minute distance, until it is opened wide, the container withdrawn and the door brought to the fully closed position again after the insertion of a new container.



Every detail has been perfected to make these Johnson Fare Boxes foolproof and "beat-proof." There is absolutely no possibility for theft.

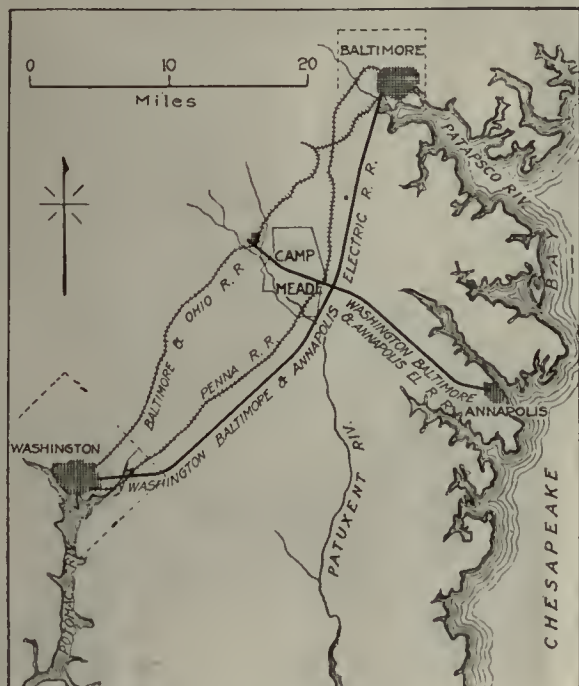
The construction has been standardized so that any accidentally broken part may be replaced from stock.

Let us take up your fare collection problem in detail. We can convince you that Johnson Fare Boxes pay for themselves in a short time. Write.

JOHNSON FARE BOX COMPANY

Jackson Boulevard and Robey St., Chicago
50 East 42nd Street, New York

Around the Continent With Hale and Kilburn



MAP SHOWING CAMP MEADE AND RAILROADS
WHICH SERVE IT

On the Great
Cantonment Interurban
Washington, Baltimore
and Annapolis

In all their years of service, the seats in the cars of the Washington, Baltimore & Annapolis Electric Railway never received such intense usage as now. When the erection of Camp Meade has brought unprecedented travel to this

popular high-speed interurban. But whoever looks down the line of Hale and Kilburn leather-covered cross-seats in these cars will be struck by their splendid alignment—a condition which speaks volumes for the

STURDY CONSTRUCTION WHICH PERMITS
THE SEATS TO RETAIN THEIR COMFORTABLE FORM

Nor should it be forgotten that these seats are fitted with the exclusive Hale and Kilburn grab-handle—the safest, as well as the most convenient design for both high-speed and city service.



Hale and Kilburn Corp.

Philadelphia
Washington
St. Louis

New York
Atlanta
Chicago

San Francisco
Louisville
Dallas





On This Safety Car

An International Fare Box Gets the Cash.

An International Register tallies the paper tickets received.

Nothing that they could foresee was left undone by the Tampa Electric Company to make their safety car operation successful.

In fare collection they were seeking and secured the best for their conditions.

An International Fare Box handles all cash, while an air-operated International R10 Single Square Register counts transfers and tickets.

There is nothing too difficult for International equipment to tackle.

The International Register Company
15 South Throop Street, Chicago, Ill.



Cut Out Hot Boxes and use one-third less oil with a **MILWAUKEE** Waste Saturating System

You know that when Cotton Waste is THOROUGHLY SATURATED WITH OIL TO ITS INNERMOST FIBRE, THEN DRAINED ENTIRELY OF FREE OIL, IT IS FAR BETTER FOR CAR JOURNAL LUBRICATION than when prepared the ORDINARY way. It will pay to look into this matter NOW. The outfits do not cost much, and we can make QUICK DELIVERY.

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Every PURCHASING AGENT, SUPER-INTENDENT, and FOREMAN should have our handsome Illustrated Catalog. It shows outfits for Oil Houses, Stations of various kinds, and is easy to select from. There is an outfit or two in it that YOU want. Drop us a line. Just say "Send me your RAILWAY CATALOG."



Uncle Sam Wants Oil and Labor Saved

Milwaukee Oil Tanks and Pumps represent the very LATEST IMPROVEMENTS for Safe and Economical Oil Handling, and no road can afford to ignore them. No road is too small or large to Save Oil and Labor, and our Line contains a large number of different outfits to select from, and to meet every situation. Many of the most prominent Roads continually specify our Equipment.

Milwaukee Tank Works
Milwaukee, Wisconsin



THE MILLER TROLLEY SHOE

is in its Second Year of Successful Service
at Wilmington, N. C.



THE Tidewater Power Company, first tried the Miller Trolley Shoe early in 1917.

It got 18,000 miles from the contacts alone, and that record was quite sufficient in itself to prove the economy of the Miller Trolley Shoe.

But more than the advantage of long life, this railway got the added advantages that come from the use of a collector that clings to the wire at any speed and any curvature.

Thus avoiding the destruction of the overhead line, the loss of time in transportation and, not least important, the annoyance which the platform men feel when they have to reset a pole every time they strike a curve or a change in alinement.

Sound reasons like these must be just as

TROLLEY LINE CONNECTION

The beach is connected with Wilmington by the well-equipped, up-to-date trolley line of the Tide Water Power Company. During the Summer season high speed electric trains run between Wilmington and the beach every half hour from early morning until late at night. A convenient schedule is also operated between seasons. During the season these electric cars meet all important incoming trains at the Union Depot in Wilmington, and carry passengers bound for the beach through to their destination without change of cars.

applicable to your property as to that of the Tidewater Power Company and scores of other users.

Just order enough Miller shoes to equip your *hardest line!*

Miller Trolley Shoe Co., West Newton, Mass.

SPECIAL REPRESENTATIVE: Holden & White, Inc., Chicago

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Hot Box Accidents Must Go



COSMIC METAL BEARINGS

Prevent Hot Boxes—Eliminate Babbitting

If we fail to eliminate your Bearing Troubles,
no matter how chronic, we make no charge.

Cosmic Metal bearings for armature, axle or motor are made exceptionally strong and tough, to give long life and a slow, even rate of wear. Under actual working conditions and tests they have proved far more dependable than bearings made of other metals.

They have sufficient strength to carry any load and are easily lubricated. If, through accident or other cause, they should not be properly lubricated, they will continue to run *without injuring the machinery* until attended to.

This is a very important point, because ordinary bearings which are improperly lubricated, or hard to lubricate, will generate intense heat. This rapidly causes the bearing to melt, or to fuse and stick, causing serious and costly damage to machinery.

Bearings made of Cosmic Metal will not stick or grab the shaft or axle, even though lubrication does not reach them. They prevent hot boxes with their resultant accidents, and in the end are a much safer and more economical equipment than any other bearing. Let us send further information.

COSMIC METAL COMPANY

420 Walnut Street, Philadelphia

See This Dallas Car?



—it will soon be BOYERIZED

THE Dallas Electric Railway has just joined the big clan of users of Boyerized Brake Pins and Bushings—500 pins and 1000 bushings as a starter.

A good name travels far and that is why Boyerized Products can be bought on the reputation they have made on hundreds of roads throughout the United States.

We are satisfied that Dallas will come back for more because it's our specialty to make case-hardened pins, bushings and other wearing parts with the absolute uniformity assured only by the use of special machinery instead of a blacksmith's guesswork.

If you are not on the roll of Boyerized roads, join now!

ELECTRIC RAILWAY SUPPLIES

Bemis Car Truck Company

SPRINGFIELD MASS

TURBOGEAR

FAST PATENTS

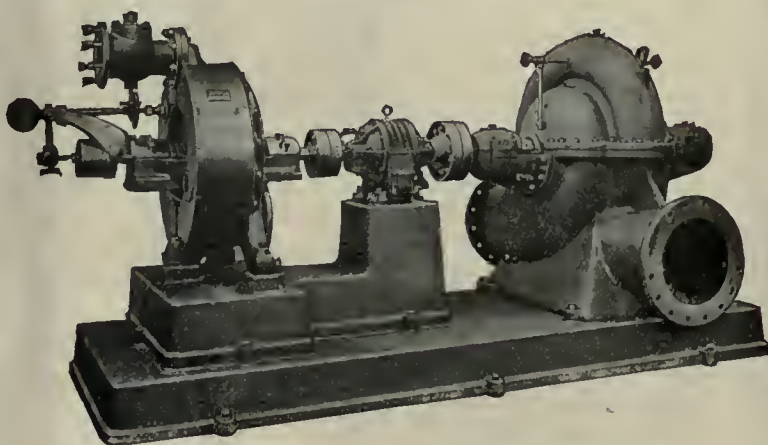
Dependability of Power Uninterrupted Service Economy in Operation

Dependability of power, uninterrupted service, economy in operation are the principal features sought for in the power plants of electric railway systems.

Turbine-driven power plant auxiliaries offer these advantages and have long been recognized as particularly desirable, but their application has been limited because the economical speed of the turbine is usually far greater than the most economical speed of the driven unit. The problem of reducing the turbine speed to that of the driven machine and yet have each run at

their most efficient speeds is solved by using the Turbo-Gear.

The Turbo-Gear is a self-contained, mechanical power transmission interposed between (see photo) and directly coupled to the prime mover and the driven unit. It can be used as either a step-up or step-down speed transformer.



Turbo Gear-Turbine-centrifugal pump drive. 85 hp.
3000 to 670 r.p.m.

A few advantages of Turbo-Gear drives are:

1. High efficiency (97% guaranteed)
2. Low first cost.
3. Low erection cost.
4. Low maintenance charges.
5. No noise—no vibration.
6. Small floor space required.

Write for Bulletin No. 100.

The Poole Engineering & Machine Company

Manufacturers of Gears and Power Transmission Machinery Since 1843

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MORE-JONES : ARMATURE : BABBITT METAL

Contains No Lead

Here is a babbitt metal specifically designed for armature bearings in electric railway service.

It is an alloy of tin, copper, antimony and metallic nickel—contains not a trace of lead. Every atom of its composition is pure, new metal; tough, strong, pliable and of the lowest specific gravity—at least one-third lighter than lead-base babbitts. Consequently, it will go much farther, pound for pound.

A majority of the leading electric railway systems use More-Jones' Armature Babbitt. They have found that because of the long-wearing, anti-frictional qualities, it is the most economical. It can be re-melted over and over again; retaining its efficiency, and with barely any loss in weight.

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Low grade babbitt not only means frequent bearing renewals, but very often, repairs to armature coils. Unquestionably, More-Jones' Armature Babbitt will prove the best investment in the end.

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3134 N. Broadway

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prices on application*

*Just taken out of service long enough
to get its "pitches taken". It's running again now.*



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AFTER
463,424 MILES

IN SERVICE TEN YEARS
CHICAGO ELEVATED LINES
ONE THIRD WORN OUT.

TOOL STEEL GEAR & PINION CO.



Write for price on combination
Arc Welding and Rail Bonding
Outfit weighing only 225
pounds.

Saturday's Report

"Welded the following:

- 1—MCB Drawhead
- 1—Center Bearing
- 1—Gear Casing
- 2—Cast Iron Crank Handles
- 1—Set Bolt Cutters

Signed MAUS."

The Electric Railway Improvement Co., Cleveland

Seven Posts to the Sack

Just to save a few dollars makeshifts are sometimes put in.
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No time, especially when with

Standard Fence Post Moulds

All Steel

McElroy System

you can get seven standard posts out of each sack of cement—and keep your labor charge very low. Note the T-shape of the posts—a big saving there.

Assembled "Fool-proof" Towers insure uniform strength.

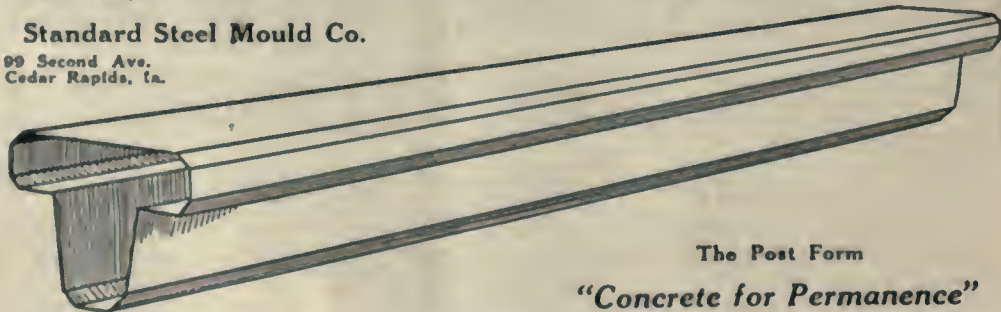
Why experiment? We offer you 20 years' experience as fence experts. Over 12 years of extensive manufacture of Concrete Fence Posts and Steel Moulds, handling hundreds of miles of fence contracts. More than a million posts in Iowa alone. Others in 38 States.

WE USE ONE-FOURTH-INCH ROUND DEFORMED BARS.

Write for full details of Standard Post Forms and Stan-Ste-MoC Building Rock Forms today.

Standard Steel Mould Co.

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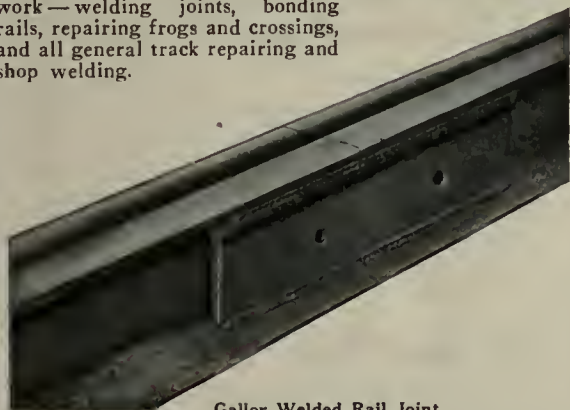
The Post Form

"Concrete for Permanence"

The Lincoln System of Arc Welding offers the best opportunity for repairing your present tracks

BECAUSE of the present shortage of materials and labor, it will be almost impossible to lay new track during the period of the war, but you cannot afford to neglect present track—it should be repaired for service until conditions improve.

Lincoln equipment makes it easy to carry out this policy of conservation and put your tracks in good shape at the minimum cost. One Lincoln outfit will do all your repair work—welding joints, bonding rails, repairing frogs and crossings, and all general track repairing and shop welding.



Gallor Welded Rail Joint

By the patented Lincoln process, the work is done so quickly that repairing may be done without interrupting regular traffic schedules. The Lincoln Dynamotor welds so thoroughly that the welded section will "stand up" as long as the rail to which it is applied. The Lincoln outfit is light in weight, all self-contained in a wheel cart, so it can easily be taken to and from the job by one or two men. The same outfit can be used later for welding joints and bonding new rails. It will pay you to get the facts of the Lincoln outfits. When may we explain in detail?

Write us or our nearest agent, today!



Lincoln Rail Bond

THE LINCOLN BONDING COMPANY, General Office: CLEVELAND
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AGENTS: { BOSTON, Chas. N. Wood Co.
PHILADELPHIA, Railway Track-work Co.

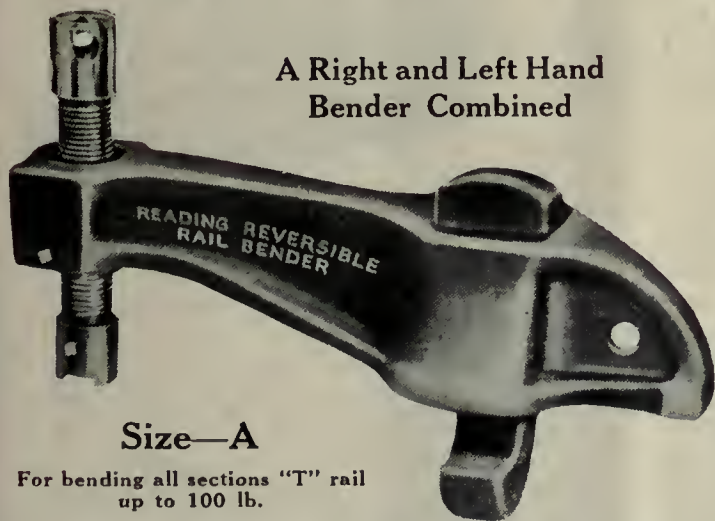
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ST. LOUIS, W. L. Rose Equipment Co.

CANADA, Lyman Tube & Supply Co., Ltd., Montreal, Toronto, Winnipeg.

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A Right and Left Hand
Bender Combined



Size—A

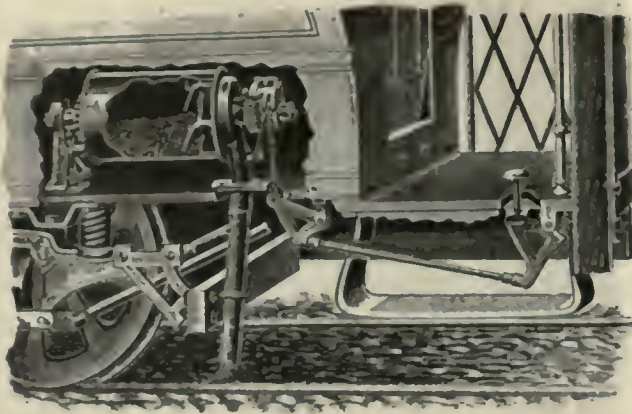
For bending all sections "T" rail
up to 100 lb.

It has a greater working radius than any other Rail Bender on the market. It will bend a Rail nine inches from the end, either right or left without adding another section of Rail and Splice Bar.

You can make your own Guard Rails. You can stock your Rails at the switch points, without removing points. You can take out your surface kinks.

You can save money by letting us explain further the many uses of our Right and Left Hand Bender.

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One of the "Anderson" Specialties

Send for catalog.

ANDERSON Trouble-Proof Equipment

Many roads have adopted the Anderson line as standard equipment, for they have found that it pays to use trouble-proof material.

By reducing overhead repairs, Anderson specialties quickly pay for themselves.

The Anderson line of specialties includes overhead line material—insulators, crossings, crossovers, ears, splicers, strains, etc.—trolley bases, poles, harps, wheels, section switches, quick break switches, motor brush holders, sanders, and many other products. Wherever insulation is required, we use only the standard Aetna Insulation.

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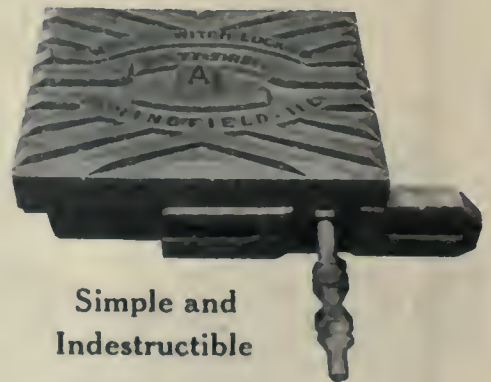


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Ends All Switch Troubles

Here is a positive railway switch point lock that locks both right and left, locking the switch so tightly that there is no chance of splitting it. Once installed it absolutely ends all switch troubles, for it is *water-proof, non-freezable, mud-proof and sandproof*. It never requires attention, it is safe, dependable and practically indestructible.

**Watertight
Non-Freezable
Mud-Proof
Sand-Proof**



**Simple and
Indestructible**

This switch lock is exceedingly simple in design, having very few parts, none of which are complicated. The box is absolutely tight, to prevent loss of oil, with which it is filled. It has a stuffing box where the connecting rod passes through, to prevent the entrance of water or dirt.

The heaviest traffic will not interfere with or damage the Weiss Switch Lock.

You can install one on approval, for 30 days' trial, but be sure to give measurements from top of rail to center of bolt holes.

WEISS SWITCH LOCK CO., 600 E. Capitol Ave., Springfield, Ill.

Blast Furnace Slag

A careful process of preparation has made possible the transformation of blast furnace slag into modern reinforced concrete structures; into indestructible and unsurpassed wearing surfaces on some of the best roads of the country; into concrete water tanks that have served their purpose for years without signs of leakage; into fireproofing materials whose fire resistive qualities are unequalled; into foundations for heavy machinery; into culverts, dams, bridges and many other uses in a wide and varied field of industrial usefulness.

It has been found—

1. That slag is the lightest form of concrete aggregate available.
2. That its strength is unsurpassed by the best stone aggregate.
3. That its chemical composition insures a material that is practically everlasting—it cannot disintegrate.
4. That, with its porous construction and decided angularity, slag possesses superior bonding qualities.
5. That within haulage radius from blast furnaces the use of slag is real conservation—it is true economy to use a material ready to hand rather than to make one by the performance of work on quarry, crusher or dredge.

Then, too, it is easier to work because of its lightness and abounds in sufficient quantities to insure prompt deliveries.

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*How would you
describe a "fuse"?*

ONE man says "It's a metal link buried in powder in a paper tube with brass ends." Another says "It's a protection device that may be expensive at a cost of 25c. or cheap at \$500—depending on how it is made."

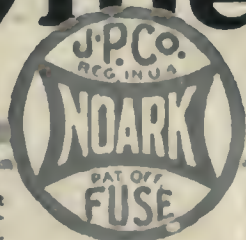
Men define a fuse differently, depending on their experience with fuses and it's interesting to see how important a fuse becomes in a purchaser's mind when he has had troubles and expense due to bad circuit protection which is usually attributable to faulty fuses.

"NOARK" Fuses are going in more circuits each year. The 100 extra precautions that you may call pride of the maker, or reputation of the Brand, or quality of the product—are making records for them on the same locations where other fuses have been found wanting.

H. W. JOHNS-MANVILLE CO.
New York City
10 Factories—Branches in 51 Large Cities



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Manufactured by the Johns-Frost Co., Hartford, Conn. H. W. Johns-Manville Co., Sole Selling Agents.

A Timely and Patriotic Business Proposition

Cut Out the Waste!

NOW is the time to clean up!

Every piece of idle equipment, unnecessary material or scrap represents WASTE!

—*waste*

Money!
Time!
Space!
Labor!
Material!

—the *money* such equipment or material cost earns nothing and is not available for other use.

—the *time* it is idle is wasted when it can render service elsewhere.

—the *space* it occupies costs money and may be needed for other purposes.

—the *labor* of its manufacture is wasted and also the labor of producing a duplicate for the man who *can* use it.

—the *material* it represents would be a welcome addition to present short stocks.

Cut out *all* this waste. Don't have material or equipment around that is not needed. Turn it into cash.

There never was a better market for either scrap or good used machinery. There never was a time when conservation of both materials and machinery counted for so much to the whole nation.

Buyers for junk or scrap are readily found in most localities. Buyers for material or good used machinery you don't need can best be reached through the Searchlight Section.

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Satisfaction is usually backed by reason. That reason, however, may be simple or complex.

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are satisfactory because the very best rubber compounded scientifically and skillfully applied to a closely woven fabric have given the best results on taping jobs.

Shield Brand Tapes are endorsed by experienced electricians for their firm adhesive qualities and their stability under weather and temperature changes. They do not dry out or curl. There is tape for every trade. **SIXTEEN SHIELD BRANDS**, the acme of present-day perfection. Be sure the Shield guides you when next considering your taping needs.



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MECHANICAL GOODS DIVISION

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EFFICIENT SERVICE AND PROMPT DELIVERY

have placed the

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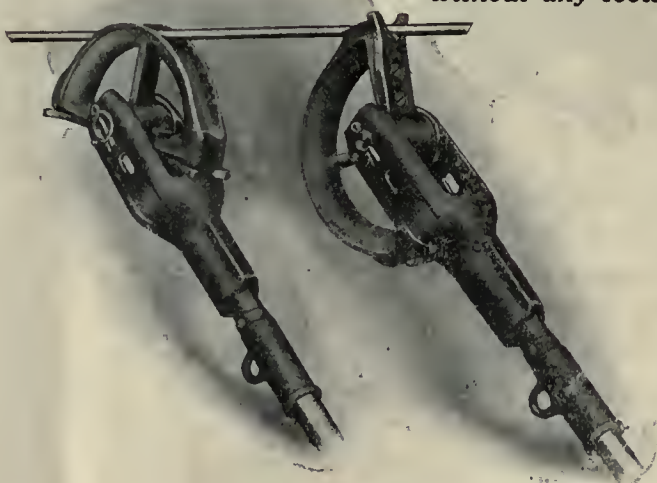
in the front rank. It keeps your cars on schedule time.

Bayonet Anti-Friction Base has all wearing parts bushed.

Self-Lubricating. Non-Breakable, Poles Changed in One Minute.



From Trolley Wheel to Semi-Rotary Sleet Cutter in 10 SECONDS without any tools.



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Operating Cars Without Gear Cases is Expensive

and unnecessary if you will order your requirements before your stock is exhausted.

Make due allowance for prevailing war conditions affecting manufacture and delivery.

We have sufficient stock of raw materials to take care of orders booked, as well as your requirements for three months commencing shipment 6 to 8 weeks from receipt of order.

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Make M. C. B. Cars of Your Interurbans

The development of the Van Dorn interchangeable M. C. B. coupler head makes it possible to change your interurban cars into the M. C. B. class with little trouble and expense.

Through an adaptation of the Van Dorn coupler shank the M. C. B. head can be installed on interurban cars without disturbing the present draft gear. The process is simple. The results are gratifying. With-

out much labor cost, and with but little delay any car of the thousands of interurban cars now equipped with the Van Dorn No. 100 swivel draft gear can be made into M. C. B. cars. All that is necessary is to purchase the M. C. B. head, which has a shank designed to perfectly fit this type of draft gear and replace the present head with it.

We are prepared to supply these M. C. B. heads on short notice.

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Made of
Galvanized Anti-Corrosive NO-CO-RO METAL

It means that "ACME" Culverts are made of practically pure metal.

It means long service. Thousands of feet have now been in the ground for ten years or more without appreciable deterioration. It means all round culvert satisfaction for you.

Ask for Catalog M-21



A Great Combination



No. 1 to sweep crossings.

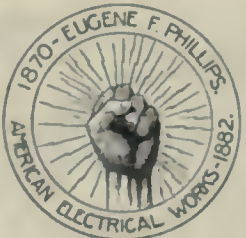
No. 2 to handle light dirt and snow in the frogs, switches, and curves.

No. 3 to remove ice, slush and mud from the same places and a chisel point on the end of the handle to loosen the ice and crust.

No. 1 and No. 3 contain Flat Steel Tempered Wire, and nothing superior can be produced. Serviceable all the year round. Your road is not complete without them.

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Now Think About It
We cannot get those Ships
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THE RAILROADS

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OF EVERY DESCRIPTION.
HARD CENTER CONSTRUCTION.
Balkwill Articulated Cast Manganese Crossings

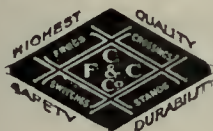
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Insure uniform superheat at temperature specified

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saves time, strength and trouble. The many positions to which it is adjustable easily solve perplexing lifting problems. Full details in our catalog. Write for it.

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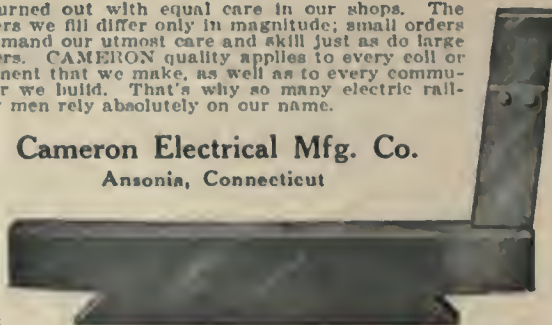
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A Single Segment or a Complete Commutator

is turned out with equal care in our shops. The orders we fill differ only in magnitude; small orders command our utmost care and skill just as do large orders. CAMERON quality applies to every coil or segment that we make, as well as to every commutator we build. That's why so many electric railway men rely absolutely on our name.

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Motor and
Generator Brushes**
For Railway Equipment

and for all other types of
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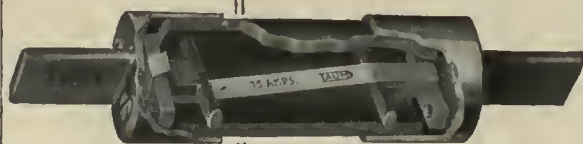


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Interurban Train Dispatcher Register Systems

The
STANDARD REGISTER COMPANY
DAYTON, OHIO

Write for booklet



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The Fuse You Would Demand

If you had studied fuse requirements for many years, and spent a lifetime building fuses to meet the most severe requirements; if you had bent every energy to design the best possible Fuse—and then make it—the result would be exactly what we have accomplished—the "DAUM FUSE."

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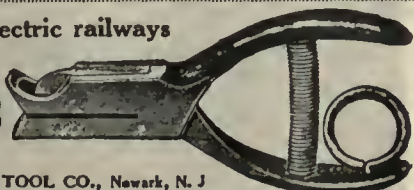
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We have on hand for immediate shipment over 7000 high grade Butt Weld poles—made from special high carbon skelp. Sufficiently flexible but without taking a permanent bend at 35 to 40 pound wheel pressure.

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"HONEYCOMB" AND "ROUND JET" VENTILATORS
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Electric car heaters—thermostatic control—
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Show origin and destination of
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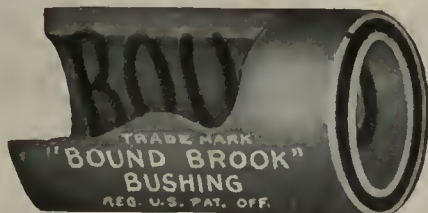
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	Wheel Dia., Inches	Wheel Miles	Bushing Miles
Railway No. 1—City	4	8,600	8,600
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Railway No. 4	5	15,000	15,000 or more with better inspection
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3 Seconds' Oiling for 3 Days' Running

The Hensley Trolley Wheel is lubricated by force-feed, which insures proper lubrication at all times and under all conditions. Oiled twice a week in three seconds' time, it reduces friction to a minimum.

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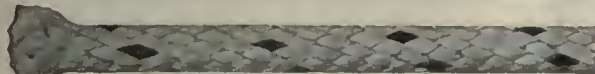


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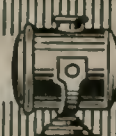
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- 1—300-kw. Westinghouse Rotary Converter, 3-ph., 60-cy., 370-v. A.C., 575-v. D.C., 600 r.p.m.
- 3—300-kw. General Electric, 3-ph., 60-cy., 600-v., 1200 r.p.m. Rotary Converters with transformers.

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- 3—750-kw. General Electric, 60-cy., O.I.S.C., 2200/4400 volts prim., 281/488 Y secy.
- 3—200-kva. General Electric, 60-cy., air blast type, 2200 volts prim., 370 secy.
- 6—185-kva. Westinghouse, O.I.S.C., 60-cy., 2200-v. prim., 370 secy.

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- 1—70-ft. Steel Combination Passenger Car Body, practically new.
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- 4—General Electric No. 203 Motors.

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Direct Current Belted Generator

1—500-kw., 550-V., 320 r.p.m.
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Everything in the Line of Repairs to Electrical Machinery

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Write for Price and Full
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One Hill Pump Co. centrifugal deep well
pump, consisting of 11—8-ft. wall sections and
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Motor and pump both new. Capacity 500-
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16,000 tons—with Angle Bars to match.
Available immediate shipment and centrally
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We positively own these Rails and offer
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25,000 tons—Relays—sizes 25 lb. to 100
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Immediate shipment guaranteed and prices
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Carload and less than carload inquiries and
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Rails cut to lengths for structural purposes.
Frogs, Switches, Bolts, Nuts, Spikes and all
Accessories.

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- 3—Dixon Corliss Engines, belted type, 150 hp. each.
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- 4—Extra Filed Coils for same.
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- Complete Switchboard.

FS230—Elec. Railway Journal,
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POSITIONS VACANT

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DRAFTSMAN, experienced on electrical power plant or sub-station work. Good future for men of ability. New York & Queens Electric Light & Power Co., 444 Jackson Ave., Long Island City, New York.

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RAILWAY armature winder wanted; experienced in armature winding and repair work. Gary Street Railway Company, Gary, Indiana.

POSITIONS WANTED

AUDITOR solicits change; thirteen years' experience in Street Railway Accounting; age 35; married; references. PW-223, Elec. Ry. Journal.

CLAIM agent, regarded as one of the ablest and most successful, one of the leading experts in accident prevention and high class transportation man, desires change. Particularly desirous of becoming attached to a property in which the accident expense is regarded as unreasonably high. Would undertake to bring about substantial reduction and can do so within a reasonably short time. Highest references. PW-217, Elec. Ry. Journal.

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SPIKES AND BOLTS

150 kegs H. H. Pressed Point R.R. Spikes, $\frac{3}{8}$ in. x $5\frac{1}{2}$ in.
15 kegs B. H. O. N. track bolts $\frac{3}{4}$ in. x $3\frac{1}{2}$ in.

POLE BRACKETS

125—9 ft. 52—10 ft. complete except stand.

BRIDGE

Deck girder, 4 spans, 30 ft. each. Made of 24 in. 73 lb. I beams, weight 23,000 lb.

All the above are new and offered for immediate shipment.

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Have no phone.

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FOR SALE

We have abandoned our Power Plant at Kutztown, Pa., as we are buying our power, and have for sale a lot of fine Generators, Engines, Switchboards, Belts, Boilers, Pumps, etc., all in very good condition. If you are interested at all, come and look it over, or at least ask us for a list of what we have for sale.

Allentown & Reading Traction Co.
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SELL your second-hand machinery through THE SEARCHLIGHT SECTION

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Equally as good as new, approximately fourteen miles 2/0 bare grooved

TROLLEY WIRE

and four miles 4/0 in long lengths, second-hand, but in first-class condition.

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ROTARY CONVERTER

One Thousand (1000) kw., 6-phase, 60-cycle, 600-volt.

Also Three (3) 400-kva.

TRANSFORMERS

1-phase, 60-cycle, primary voltage 13,000.
William T. Twomey, 111 W. Monroe St., Chicago

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can be given on the following equipment

MAKE US AN OFFER

1—Open Car
Type—Open, 15 bench, double trucks
Built by Wason Mfg. Co.
Type Trucks—Wason No. 21
Type Motors—Westinghouse 12-A
Motors per car—4
Controllers—K-6
Gear Ratio—15-69
Wheels—30-in. diameter, 21-in. tread
Air Equipment—AA-1 compressor and Christensen motorman's valves
Body Overhauled—1915
Trucks Overhauled—1917
Painted—1916
Complete with trolleys, headlight resistance dasher lights.

1—Open Car
Type—Open, 15 bench, double truck
Built by Wason Mfg. Co.
Type Trucks—Wason No. 21
Type Motors—None
Motors per car—None
Controllers—None
Gear Ratio—61 gears
Wheels—30-in. diameter, 21-in. tread
Air Equipment—AA-1 compressor and Christensen motorman's valves
Body Overhauled—1915
Trucks Overhauled—1917
Painted—1916
Trucks are not equipped with motors, but 6 West. 12 A can be supplied; also 2 extra sets of wheels and about 25 brake shoes.

1—25-ton Freight Motor
Type—Box, with still channels for center axles, attached to MCB Couplers, double truck
Built by Laconia Car Co.
Type Trucks—E. H. Locomotive (Taylor Improved)
Type Motors—GE-67
Motors per car—4
Controllers—K-6
Gear Ratio—15-69
Wheels—4-in. tread, 33-in. diameter, FCS
Air Equipment—Westinghouse separate, straight and automatic 12 A Compressor
Body Overhauled—1916
Trucks Overhauled—New 1916
Motors—In good condition
Painted—1916

Equipped throughout for handling standard freight equipment. Would make a good express car. Could be shipped in regular freight train—that is, without loading on any other car.

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1—Westinghouse, 400-amp., 750-volt, circuit breaker, new.

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About 1000 ft. 7-in. girder Lorain Steel Co. rollog No. 97-420 new Rail, with splice bars and flat tie rods.

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Claremont, N. H.

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Bemis Car Truck Co.
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Carnegie Steel Co.
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St. Louis Car Co.
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Electric Storage Battery Co.

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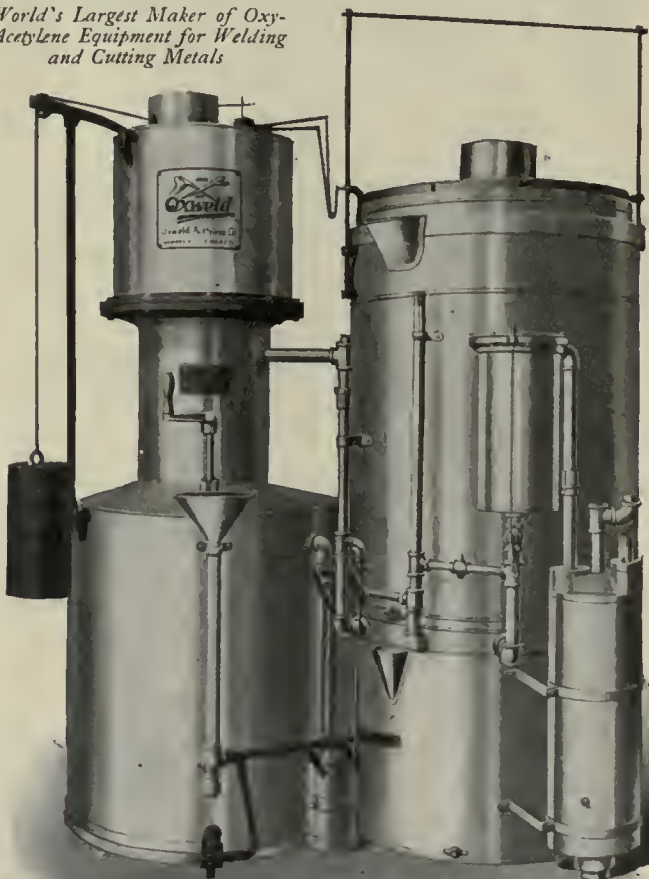
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Brill Co., The J. G.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.

Tubing, Steel.

National Tube Co.

Turbines, Steam.

General Electric Co.
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Ohio Brass Co.
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Holden & White, Inc.
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Nichols-Lintern Co.
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Collier Service



At Austin, Capital of Texas

Although not a large system, the Austin Street Railway is a progressive one as instanced by its early use of Safety Cars.

The good service which this company gives its riders is paralleled by the Collier Service (which also means good service) given to the advertisers who use space in its cars.

Car riders whether in a big town or small are attracted to the car cards only if they are of high grade and the announcements of reliable merchants national or local—who make good.

The growth of Collier Service to national dimensions has been due in large measure to appreciation of this fact for we realized that otherwise the value of car card advertising as a revenue producer for the electric railway could not be a permanent institution.

Barron G. Collier
INCORPORATED

Candler Building
220 West 42nd Street, New York City



Are
Made by
Experts

Columbia Bearings



There's a lot more to making a good bearing lining than pouring the metal into a mold.

There's the right formula for the service, and the need for seeing that the mixture is made at just the right temperature so the metals will really mingle.

There's the need of making the inside of the bearing as smooth as glass, for in this case: "What starts well, ends well."

*Whether your bearings are bronze or iron, we're with you.
And here are other Columbia-Made Specialties.*

Columbia Machine Works & Malleable Iron Co.

Atlantic Ave. and Chestnut St.

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Armature and Axle Straighteners
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Armature buggies and stands
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Banding and heading machines
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Car replacers
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Pinion pullers
Pit jacks
Signal or target switches
Tension stands

W. R. Kerachner Co., Inc., N. Y.
Holden & White, Inc., Chicago
F. F. Bodler, San Francisco
Railway & Power Eng. Co., Ltd.,
Toronto, Ont.



CAR EQUIPMENT

Armature and Axle Bearings
Armature and field coils
Bearings (Axle and Armature)
Brush-holders and brush-holder springs
Brake, door and other handles
Brake forgings, riggings, etc.
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Commutators
Controller handles
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Grid resistors
Third-rail shoe beams and accessories
Trolley poles (steel) and wheels



BRILL RADIAX TRUCK



“Are most of
the Radiax
Trucks shipped
abroad?”



is a question that has been asked a number of times. No, just about as many have been furnished to rail-ways in the United States. Wherever there is a need for a single-track carbody of twenty-two feet or more over the corner posts there is a need for the Radiax Truck whether in

Shanghai, Kyoto or Melbourne, or in San Antonio, Asheville or Portland. The above illustrations are of cars on Radiax Trucks put in service during the past year in the last named cities. Bulletin 229 gives dimension tables and full description.

J. G. BRILL COMPANY
PHILADELPHIA, PA.



G. C. KUHLMAN CAR CO.
CLEVELAND, OHIO

AMERICAN CAR COMPANY
ST. LOUIS, MO.

WASON MANUFACTURING CO.
SPRINGFIELD, MASS.



In 1915 the lightest modern electrical equipment on the market weighed approximately 4500 pounds per car.

The Light-Weight Safety Car of to-day has an electrical equipment, consisting of two GE-258 Motors and K-63 control, weighing only 2400 pounds. A ton of dead weight has been removed and yet with this equipment faster schedules are being maintained than was considered possible heretofore.

But the eventual greater economies resulting from the use of light-weight cars and equipment will be found in the use of lighter rails for replacement work, less copper in the feeder system, smaller power station or substation capacity, etc.; a big reduction in overhead costs and investment.

"Some Installations of the GE-258 Motor on Light Weight Safety Cars."

Austin, Dallas, Fort Worth, Texas; Bel-
 lingham, Everett, Tacoma, Seattle, Wash.; Cedar Rapids, Keokuk, Okla.; Tulsa, Okla.; St. Joseph, Mo.; Bos-
 ton, Plymouth, Warren, Mass.;
 Alchison, Wichita, Kan.; Centralia, Kankakee, Pekin, Ill.; Colorado Springs, Col.;
 Meadville, Pa.; Hot Springs, Ark.;
 Aberdeen, S. D.; Lincoln, Neb.;
 Vickburg, Miss.; Ironwood, Mich.;
 New Albany, Ind.;
 Chico, Cal.; Mad-
 ison, Wis.

7558

General Electric Company

General Offices:
 Schenectady, N. Y.



Sales Offices
 in all large cities



ELECTRIC RAILWAY JOURNAL

August 24, 1918



IN Schenectady—famed for its vast electrical industry—S K F equipped General Electric railway motor armatures are an important feature of the railway equipment.





Fighting Snow

"Boss" said Joe the Superintendent to the General Manager, "While I was East last week looking up snow-fighting equipments on other roads, I was greatly impressed with the snow sweepers designed and built by the Public Service Co. of New Jersey. They have taken out all the kinks.

They use a Morse chain drive in an oil-tight gear case. The whole equipment is beneath the floor frame-work and, from what the transportation department told me about the performance of those sweepers, they were worth their weight in gold last winter. They are equipped with Westinghouse 75 horsepower, No. 310 box frame motors."

"Well, Joe," said the General Manager, "your trip was well repaid. I can now dismiss this problem from my mind. You know what we need, so go ahead and get it."

Westinghouse Electric

*Sales Offices in
All Large American Cities*



& Manufacturing Co.

**East Pittsburgh
PENNSYLVANIA**

Electric Railway Journal

H. W. BLAKE, *Editor*

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Air Brakes for Every Service



"SAFETY" Car, Northern Texas Traction Co.,
Fort Worth, Texas. Weight, 14,000 lbs.
Semi-Automatic Brake.

We supply air brakes for all kinds of electric railway cars from the light weight, "SAFETY" car to those in heavy, multiple-unit train service.

We recommend semi-automatic schedules for single city cars, with and without occasional trailers;

Train on the New York Municipal Railway. Car weight, 87,000 lbs. Electro-Pneumatic, Variable Load Brake.

automatic brakes for trains of two or three cars in city, suburban and interurban service; and universal variable-load brake, electrically controlled, for elevated and subway trains.

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Boston, Mass.
Chicago, Ill.
Columbus, O.

Denver, Col.
Houston, Tex.
Los Angeles, Cal.



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Brake Building our Business for a Lifetime



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Quality First



Tomlinson Spring Draw Bar Carriers take care of severe breaks in grade without undue strain on car sills



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Note Air Connecting Gaskets.



5 Point Electric Couplers mounted on Tomlinson Air Connecting Car Couplers.

Peak Hour Problem Simplified by Tomlinson Couplers

Trailer operation is the popular way to handle peak-hour crowds. And by far the easiest way to handle trailers is with Tomlinson Couplers.

For one thing they mean rapid action. They couple cars, air lines and, if desired, any number of electric circuits automatically and simultaneously.

They are safe, too. The men need not go between cars to couple. All exposed electrical contacts are dead.

And they take care of every service condition. Tomlinson Couplers lock together rigidly and work from anchorage to anchorage as a solid unit. The spring draw bar carrier compensates for sharp changes in grade without undue strain on cars or couplers. The carrier swings on a radial bar which permits operation around short curves.

*Put your train operation problems
up to our specialists.*

THE OHIO BRASS COMPANY
MANSFIELD, OHIO

New York Philadelphia Chicago Pittsburgh
San Francisco Los Angeles



Phono-Electric

Is Well Known to Fort Worth

For among other places, you will find No. 00 size on Main Street, from Sixth Street to the Texas & Pacific depot.

Over which two-thirds (about 125 cars a busy hour) of all Fort Worth cars are operated.

Users of Phono-Electric invariably show their confidence in its long-life qualities by putting it up WHEREVER CONTINUITY OF SERVICE COMES FIRST.

Bridgeport Brass Company
Bridgeport **Connecticut**

Wasted—

35% to 50% of TRACK MATERIAL

INTERNATIONAL STEEL TWIN TIES

Obviate this wasted material and labor

Of What Engineering Value Is the Concrete or Ballast Between Wooden Ties? Absolutely None. It Represents an Economic Loss of Track Material and Labor.

Steel Twin Ties are designed to overcome just that condition. The effective tie bearing area is placed at the top of the tie and parallel with the rail.

There is an engineering reason for every ounce of metal in a Steel Twin Tie. The 13 in. x 36 in. trussed plates carry the track loads and the 3 in. channels serve as anchorages and tie rods.

Several inches of concrete beneath the tie plate puts just that much in effective bearing. An inch more than is usually used. And at the same time the excavation and concrete quantities below base of rail are reduced one-half.

Any way you look at them they are engineeringly right. The longer you delay your purchase of some of these ties the more money you waste in extraneous track materials and labor.

Ask our users if you want our best sales argument. If you are convinced ask us for a quotation and delivery.

Prompt deliveries made from stock.



Permanent Track at Less Cost
Any Type Base — Open or Paved Track

The International Steel Tie Company

Manufacturers of Steel Twin Ties and Crossing Foundations

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Los Angeles, Cal.

San Francisco, Cal.
Seattle, Wash.

R. J. Cooper Co.,
Salt Lake City, Utah.

J. E. Lewis & Co.,
Dallas, Texas.

Maurice Joy,
Philadelphia.

William H. Ziegler,
Minneapolis, Minn.



Fifteen Million Dollars in One Year For Rebuilt Track

Statistics show that last year (1917) electric railways in the United States and Canada rebuilt 375.4 miles of track.

This was not *new mileage*—not extensions. It was old track replacement. The making good of old track that had “gone to pot.” According to the best available estimates that track cost certainly not less than \$40,000 per mile—a total for all of it of fifteen million dollars.

That’s an awful lot of money for a relatively very small amount of track.

Let’s assume that five or six years ago this track had been put in good shape with the aid of a

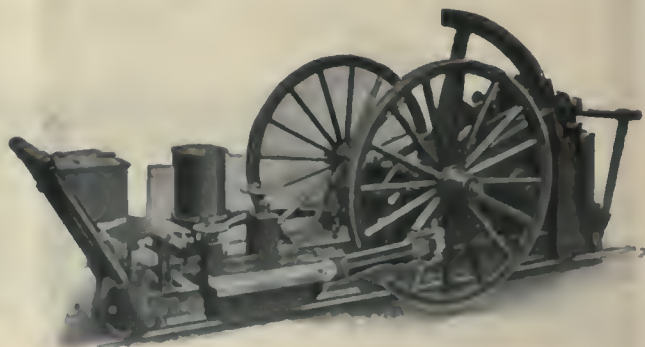
RECIPROCATING TRACK GRINDER

and with the further aid of one of these easily operated machines had been kept in good condition.

This would have cost something, of course. But its cost compared to that fifteen million would look a good deal like a brick compared to the Woolworth Building.

How about the condition of *your* track now?

Is it not possible that a Reciprocating Grinder put to work for you *now* might save *you* some of this big calibre expenditure four or five years from now? It is surely worth careful consideration.



Railway Track-work Company

30th and Walnut Streets, Philadelphia

AGENTS: Holden & White, Inc., 343 S. Dearborn St., Chicago



Do As Austin Has Done

Capital of the Lone Star State
Another ESSCO Better Service Town

The Austin Street Railway was one of the first to see the many merits of the Light-Weight Safety Car.

In planning to provide this improvement for its patrons, the company gave careful thought to the specialists for the car as well as to the type of car.

And this was its decision:

"Golden Glow" Incandescent Headlights
Faraday High Voltage Car Signals
Keystone Trolley Catchers
Keystone Rotary Gongs
Keystone Air Sanders
International Registers

ELECTRIC SERVICE SUPPLIES Co.

Manufacturer of Railway Material and Electrical Supplies

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17th and Cambria Sts.

NEW YORK
50 Church St.

CHICAGO
Monadnock Bldg.

Canadian Distributors: Lyman Tube & Supply Co., Montreal, Toronto, Winnipeg.

WESTERN RED CEDAR POLES

The Universal Poles For Universal Service

No. 1—Picture shows lines of the Kansas Gas & Electric Company of Wichita, Kansas—Wichita-Newton 60-kv. line. These are 50-foot **Western Red Cedar Poles** set in 1910. Span is 110 feet. Load carried is—3 No. 2 Bare Copper Wires, 2 Trolley Feeders, 1 Trolley Wire, 2 Telephone Wires, and 1 $\frac{1}{4}$ -in. 7-strand steel ground wire.

No. 2—Muskogee Gas & Electric Company, Muskogee, Oklahoma—This line is built of 45-foot **Western Red Cedar Poles**, spaced 100 feet. It carries 44 Power and Light Wires and two 4/0 Copper Wires.

No. 3—Showing lines of Public Utilities Company of Hot Springs, Arkansas. Poles are 35-foot **Western Red Cedar**. Load is as follows: two 500,000-C.M., one .0000, six 0, 2 No. 6.

Strong, Straight, Slightly Poles.

Western Red Cedar Association, Spokane, Wash.





Why They Save Time in Passenger Interchange ON MONTREAL'S TRAINS

It's partly the clever combination of rear-entrance leader and front-entrance follower whereby the load is evenly divided.

It's partly the arrangement for placing the cross-seat down front in the first car and back in the second car.

But it's largely because of the use of

National Pneumatic Door and Step Control

whereby the conductors secure quick opening and quick closing as well without interfering with the prompt collection of every fare or with the desire of the passenger to get to his seat as quickly as possible.

NATIONAL PNEUMATIC COMPANY
INC.

50 Church St. New York



515 Laflin St. Chicago

Can You Show Uncle Sam Coal That

THE Fuel Administration's present campaign requires such a showing at the power house. Will it stop there?

What measure have you of your power consumption on each car that will show whether or not your power is being used economically?

Power consumption is coal consumption. Coal will win the war.

Electric railways should show that they are working to save power wherever possible. Power saving has a double value. First—The direct and immediate saving alone is worth while. Second—The evidence of co-operation is equally important.

Save Coal by Saving Power

Help your motormen to save coal by letting them see how much energy they use. The open-face dial of the Economy Meter shows the motorman just how much power he uses.

He knows that by saving energy he saves money, and few men are willfully wasteful.

Because the Economy Meter measures what he is trying to save, the motor-man's interest is held and he *does* save.

ECONOMY ELECTRIC DEVICES CO.,

L. E. Gould, Pres.

Wetmore-Savage Co.
Boston, Mass.

Burton R. Stare Co.
Seattle, Wash.

Ludwig Hommel & Co.
Pittsburgh, Pa.

That You Need All The You Use?

THE Economy Meter is the only device which measures car operating efficiency directly in units of energy consumption and that, in the final analysis, is the only real basis for accurately determining power saving.

The Economy Meter provides a record that saves money and that demonstrates efficiency and economy of operation.

The many ways in which the Economy Meter promotes efficiency are described in an illustrated booklet. Tell us to mail you a copy.

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That's What You Want To Save



"The Watchdog of Your Power"

The ECONOMY Meter promotes more economical use of energy in car operation. It is easily installed by connecting in series with the car motors. It displays the car motor energy consumption on cyclometer dials like a fare register. These readings are the basis for checking the performance of motormen. Comparison of records induces sustained effort to excel.

Thus energy is saved.

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Exclusive Sales Agent: Sangamo Economy Railway Meter

Rumsey Electric Co.
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Best for ties—by every test

COMPARE Reilly's Improved Creosote Oil with any other creosote oil. The test will show that this Reilly product contains more than three times as much permanent body as the next best oil.

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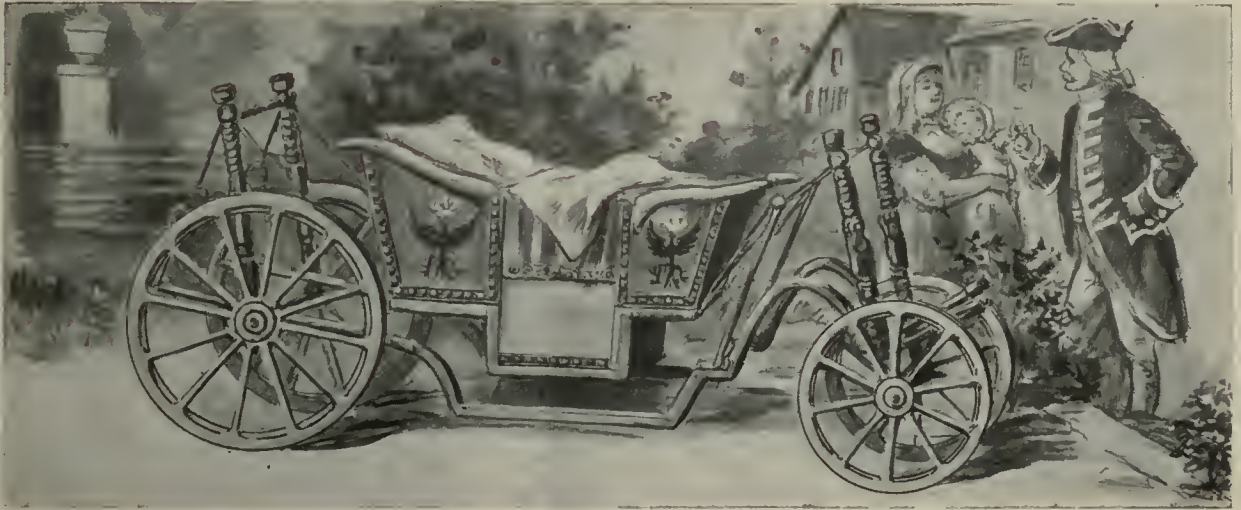
And its heavy body and freedom from volatile elements make it stay in the wood forever.

For treating ties and other timbers by the pressure process, Reilly's Improved Creosote Oil has proved its superiority. Specify it in your contracts.

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Plants: Indianapolis Minneapolis Seattle Mobile Norfolk



This child's carriage of 1700 was probably the first "sociable." It was owned by the Emperor of Germany. About this time steel springs were first used by coach builders. Formerly the bodies of carriages were suspended with leather straps.

From 8 to 50 Miles per Hour

The average speed of these carriages of the vintage of 1700 was less than 8 miles per hour.

The average of maximum free-running speed on our electric roads of today is approximately 50 miles per hour.

A comparison of these figures suggests the rapid progress made in transportation.

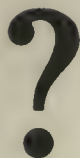
Galena Oils

and Galena Service have been a factor in the development of the American electric railway industry—an industry only 32 years old.

For nearly fifty years Galena Oils and Galena Service have shown an extremely high record of efficiency. They are still being improved to meet tomorrow's lubrication demands.

Galena-Signal Oil Co.

Franklin, Pa.



At the Mercy of the Engineer

WITH the increased cost of labor and material, and the many new problems to be met, hundreds of electric railway companies are now more than ever dependent upon the judgment of the engineer.

Power and its distribution being the biggest items to contend with, the engineer, with his resourcefulness and technical knowledge, is bringing system out of chaos.

He has a technical knowledge of electricity and its functions which are so essential in the successful operation of electric railways in these stringent times, when leaks must be stopped.

One of the best-known electrical engineers in America, Mr. Terrell Croft, has recently completed a 3000-page library of facts on the practical side of electricity.

Called to Washington

MR. CROFT, owing to his unusual knowledge of modern electrical practice, electrical machinery and the distribution of power, has been called to Washington by the Educational Committee of the War Department to standardize the electrical courses of training for enlisted men.

His Library of Practical Electricity has been pronounced the most important contribution to electrical engineering literature in recent years.

The value of the books lies in their practical application. Heretofore authors had apparently been unable to put in book form the true workings of the central station and kindred electrical subjects, and had left the inexperienced to gain his first-hand knowledge through actual work or by personal instruction in a college or university.

These eight volumes being the result of actual contact with the electrical problems in the operations of the country, they are of incalculable worth to the busy man who must solve important problems on short notice. The information is boiled down and technical, but written in a non-

technical manner. It is in clearest English and plain figures, and can be understood by even the layman. There are over two thousand illustrations of the utmost importance.

The eight volumes, size 5 x 8 inches, bound in flexible Karatol, weigh only nine pounds. They are printed on thin paper, and are pocket size.

To every one connected in any way with the operation, maintenance, or the financial end of the electric railway, we would like to submit a set for ten days' examination. There will be found so much immediate help that even a casual glance through the volumes will stamp them as a necessity in the office or on the line.

Merely write on your business stationery for ten days' examination of the Croft Library. Send no money with your order. If the books are satisfactory, and you care for the installment plan of payment, send us \$2 per month for eight months. Or for cash deduct 10% from \$16. If not pleased return the books at our expense. McGraw-Hill Book Co., Inc., 239 W. 39th St., New York. Mention this paper.



*As Simple as the
Motorman's Watch
is the Principle of the*

RICO Coasting Recorder

When you put the Rico Coasting Recorder on a car you are simply asking the motormen to understand the working of a clock—

Which prints in minutes that part of his run when the car is moving by virtue of its stored-up energy or momentum.

In other words, the Rico Coasting Recorder prints a record of the time when he is *coasting*.

You do not give him a result in something that only an engineer can comprehend but you give him a result in *time*, the thing which is the very essence of his job.

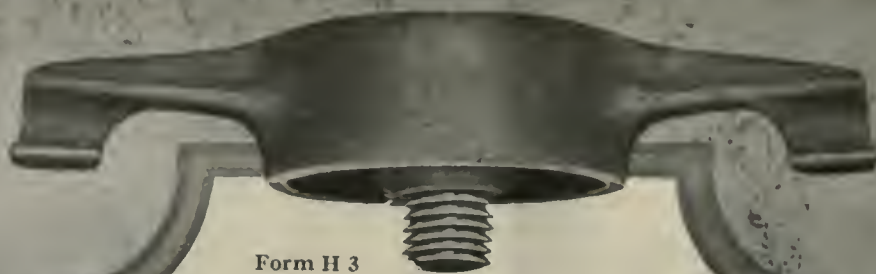
*No Car-Checking Device will
"Stay Sold" unless the Motorman
himself understands and believes
in it.*

Time is the Essence of Railroading

RAILWAY IMPROVEMENT CO.



61 BROADWAY, NEW YORK



Form H 3

Straight line Suspension

A glance at the sectional view tells the story of "Why this suspension never lets go."

Notice the stud which is mechanically fastened to the shell.

This construction means that the strain becomes practically one of metal to metal.

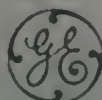
The molded insulation acts only as a waterproof seal and is never subject to strain.

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Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

Volume 52

New York, Saturday, August 24, 1918

Number 8

Tell People What the Fare Is When You Change

COMPANIES which realize the necessity of publicity as an aid for increasing their rates should not neglect its help to instruct people in regard to the proper car fare after increased rates are granted. Of course, the greater number of the people who live in the city know about any change in fare when one is made. But it must be remembered that the cars carry many strangers who cannot be expected to know that the fare has been increased from 5 to 6 cents or that a zone system has been installed, and it is surprising how many among the regular residents of a community will be ignorant of an event of this kind or forget about it when they have to pay their fare. In the interest of speed on the platform, we suggest that a placard giving the fares charged, placed in a position in the car where the passenger can read it when he pays his fare, would be of public help. It is particularly necessary for a year or so after the change has been made, but it would be appropriate at all times.

N. & W. Electrification Patriotic as Well as Profitable

MEN may build better than they know. The Norfolk & Western Railway was electrified so that the road would be able to handle more coal at less cost than would have been possible with more steam trackage. The company could not anticipate that its progressiveness would be so soon rewarded in other than a monetary way. Now the whole country may moralize on how much better our fuel situation would have been last winter—and to-day—if there had been a wider application of electrification. The Norfolk & Western Railway, at least, has nothing to regret as it moves thousands upon thousands of additional cars of coal toward the great ports and manufacturing centers buzzing with war activities. To this road the worst winter of a generation proved only a spur to higher tonnage.

The article in this issue tells the story from the operating standpoint. What a bold undertaking it was for both the customer and the manufacturer to install an absolutely new type of engine! How pleasant it is to record that practice has borne out carefully applied theory so successfully that any defects developed have been rather of materials than of design, and therefore easily remedied!

The fallacy of comparing steam and electric locomotives on a locomotive-mile basis is self-evident in the light of what these electric engines are doing in handling heavier tonnage at greater speeds and with smaller personnel. Nor have the full possibilities of this electrification been reached. We venture to prophesy

that when the need arises the company will find means to increase the capacity of its heaviest grade and tunnel section to a still greater degree either by using more of the present electric locomotives per train or by securing super-electric split-phase locomotives!

Company Sections Are Partly Missing a Splendid Opportunity for Securing Information

A QUESTION which we have not been able to answer satisfactorily is why American Association company sections and other electric railway organizations do not make greater use of the talent which is available for instructing and inspiring them. The records of company section meetings which appear from week to week in the "Association News" column of this paper contain topics and names of speakers in sufficient variety to furnish suggestions for very profitable programs. The ELECTRIC RAILWAY JOURNAL prints records of the meetings incidentally for their news value, but mainly in the hope that what one section has done will prove suggestive to others, and not only to sections of the American Association but to other company organizations as well.

When a competent speaker is secured by one section it is a fair presumption that he would be available elsewhere. His experience in addressing one section should enable him to speak better before another. Now is the time to plan for the activities of next fall. A suggestion along this line is that the files of this paper be carefully studied in order to bring to light the names of men who have demonstrated their ability to say something worth while and to say it in an interesting way.

The Motor Truck as a Freight Jitney

INTERURBAN roads in many parts of the country are reporting serious competition in freight haulage from motor trucks doing an inter-city business. This competition comes mostly in connection with the package or less-than-carload freight of the railways and where the main highways have been well improved. The great advantage of the motor truck, of course, is its ability to take on its load at the shipper's premises and to deliver it directly at the consignee's door. But this same independence of fixed conditions which is so desirable in one way is undesirable in another since it leads, under present conditions at least, to independence in all other matters as well. Like the freebooting jitney in the passenger field, the freight truck swears allegiance to no authority save to its owner. Given the requirements that a trucking company maintain the same facilities for the convenience of its patrons and assume the same responsibility as to safe delivery of its

goods as a railway, it does not take a man of very much ability along the lines of either economics or mathematics to figure out from the standpoints of both cost and labor that the balance sheet is all in favor of the railway for haulage over any considerable distance.

Transportation of freight by truck at the present time is not only uneconomical but is highly unpatriotic since it takes both man and money power from more essential enterprises. The particular job of the railways in this connection must be first properly to equip and prepare themselves for the handling of this business, and second, both by deed and by suitable publicity, to show that of the two methods of handling the freight business, theirs is the more essential.

Proposed Chicago Ordinance Is Modeled Along Progressive Lines

ALTHOUGH several important steps are yet to be taken before the proposed Chicago traction ordinance, noted elsewhere in this issue, becomes effective, the fact that the aldermen of that city have approved the measure by a decisive vote indicates that service-at-cost agreements appeal strongly to the public mind.

The Chicago situation is of special interest in view of the fact that a settlement with the existing companies was worked out through a public trustee corporation when approval of combined operation under private management seemed remote. Just as the Boston trustees, however, urged the former management to remain in office, the Chicago aldermen sanctioned the appointment of Messrs. Busby, Blair and Budd on the board of trustees. Both instances are a fitting illustration of the confidence of the authorities in the ability of those who have been responsible for service in the past. Such cases augur well for efficiency under trustee control.

The Chicago franchise has been wisely drawn for an indefinite period. The existing companies have agreed to turn over to a trustee corporation, without a dollar in payment, the local properties. In return for this they are to receive a guarantee of interest on the capital investment practically equal to the present average return of the combined companies. The traction fund of about \$25,000,000, accumulated during the last eleven years from the city's share in the net receipts of the surface lines, is to be put to a good use—for the construction of subways to be rented to the new corporation.

Like the most far-sighted settlements of recent time, the Chicago ordinance provides for an unlimited sliding scale of fares to meet actual costs. An emergency fund protects the investor against loss while the fares or transfer charges are in process of adjustment. Thus the people, other than those who use the cars, are not to be burdened with transportation charges of any kind. On the other hand, the car riders are not to pay the cost of street sprinkling or cleaning if these public benefits become a drain on the service.

The managements of the surface and elevated lines are to be congratulated on having gone thus far to bring about a solution of the Chicago transportation problem. The city authorities also are to be commended for their spirit of fair play in making necessary compromises. It is to be hoped that the 800,000 voters,

as well as the members of the State Legislature, will take the remaining steps necessary to bring about the unification of facilities. The end of the war should see Chicago started on its way toward possessing one of the most extensive local transportation systems in the world.

Let's Tell Others What We Can Do

AS MOST of the industries of this country go, that of electric railways is an old one. Perhaps it is for that reason that electric railway managers tend to be diffident about telling folks what they are able to do. We were moved to this reflection by reading the advertisement of one of the large motor truck manufacturers published in one of the greatest advertising mediums of the country, a popular periodical which counts its readers by the million. The pith of this advertising story was that motor truck freight haulage is a vital war measure because such transport saves steel. On the basis of a 2-ton truck hauling its load 100 miles per day, it was figured that the motor truck equivalent of 50,000 freight cars with their locomotives effected a saving of 1,100,000 tons of steel. It is not our thought to argue the matter, right or wrong as the figures may be. Our thought is, How do the electric roads stand in the way of comparison?

Certainly it is not hard to find interurban railways in this country where a crew of three men operating a two-car train have the capacity and do actually haul 60 tons of freight 100 miles in a working day. Using the truck manufacturer's own estimate of 1½ tons of steel per 2-ton truck, electric cars will not have more steel in their make-up than the trucks required to haul the same ton mileage. To carry the comparison a little farther is most interesting. Electric cars will require only one-tenth the labor and one-third of the equivalent fuel, and besides there are other little matters such as life of equipment and general maintenance very much in our favor. The ability of the truck freighter to collect his load at the shipper's door and deliver it direct to the consignee is offset by the greater mileage which electric cars can make when handling local freight and the greater security offered the owner of the freight, not to count such other things as highway wear and tear which the trucker leaves to the public purse through taxes of which he ordinarily pays a minimum.

How the Railways Can Help in Increasing Our Man-Power Supply

AS OUR military campaign in France becomes more active and our army increases in size, we must still further increase our efforts to utilize our man power in this country to better advantage than ever before. It has been estimated that for every soldier put in the field from four to ten workers are required in the war industries at home to keep the flow of munitions and other supplies to the front unimpaired. This means that with an army of 3,000,000 men in the field the workers at home would number at a minimum 12,000,000, or a total of 15,000,000, or if the army is increased to 5,000,000 men, as is now being advocated, a total of 25,000,000 working units would have to be withdrawn from peaceful pursuits for the industry of war. As there

are approximately only 36,000,000 working people in the United States, or that was the number before the war, the size and nature of the task before this country is obvious, even with an army of from 2,000,000 to 3,000,000. Its only solution is to employ women in a large number of those positions for which men heretofore have been considered necessary and also to dispense with services which men have been performing when this can be done without seriously interfering with the national efficiency.

Fortunately, both of these ways are available in electric railway operation to a very large extent. The woman conductor supplies one of these ways and the one-man car the other. Whatever might have been the situation if there had been no war, there can be no question of the urgency of action now in all ways in which man-power can be saved. Labor should not play the part of the obstructionist, both for patriotic reasons and because there is no danger in these strenuous times of the men displaced in this way going without employment. Both the country and the men will gain by any change which transfers the latter from non-essential to essential work.

Is It Difficult to Sell a

New Idea to a Railway Manager?

A QUESTION put to us not long ago by a manufacturer whose business brings him into contact with a wide line of industries was this: "Are railways businesslike?" Yankee style, we asked him: "Businesslike in what sense?" His reply was: "Businesslike in the sense of studying new money-saving processes on merit." Drawing then upon his experience with other industries he continued somewhat along these lines. "Compared with manufacturing industries, railway managers do not seem to have the same acute business sense. For example, several years ago we spent many thousands of dollars to develop a certain process before we tried to commercialize it. When we brought it to the attention of people in several competitive lines of business, they 'perked up' at once. No sooner had the process been explained to them than *they* began telling *us* how many thousands of dollars they would be able to save. Their only concern was that their competitors might 'beat them to it'! When we put the same proposition before the steam and electric railroads, it was a different and sadder story. A few here and there asked to be shown and then bought, but the majority were skeptical. It's hard for me to understand the difference in viewpoint. What's the answer?"

Our interlocutor had struck bottom, and we had to answer with declarative instead of interrogative sentences. We were embarrassed to make the admission, but we did say that it seemed to us that the difference was largely due to the fact that the manufacturers always had before them the costs of their operations compared with those of others who were selling to the same trade, whereas the railway company seldom had real production costs and still more seldom compared them to advantage with other properties. Furthermore, such comparison was difficult because of varying factors in different towns. Another difficulty was that the frequent change in control compared with privately-owned concerns put a premium on the use of goods of lowest first cost instead of lowest continuing cost.

"That's too bad," said our friend dryly, "but don't you think that the railway men would have been a bit keener, too, if they had to hustle everlastingly for customers?" And then we thought it was time to leave!

How Can We Run

Cars Without Crews?

NOT having arrived as yet at that stage of progress in the transportation field where we may load passengers into an accident-proof, crewless car, and by simply pressing a button shoot them quickly, safely and comfortably to their respective destinations, the above question is at present the cause of no little worry to transportation department officials. Of course, labor scarcity pinches all along the line as far as electric railways are concerned, but the pinch is certainly most conspicuous in the transportation department.

With a few emergency repairs from time to time, cars, overhead and way can be made to give service for a considerable period without much labor being expended on upkeep. Such operating practices, however, only defer the inevitable day of reckoning, but the point is that a laborer in these departments may take a day off without causing a direct reduction in service. Besides, in these departments, old men and boys who are not physically able to stand the drive of work in the manufacturing industries can still be secured to do some of the most necessary tasks.

Not so in the transportation department, however. Crew men must be active and must be trained. The failure of a crew to report nowadays usually means that their car stays in the carhouse. Extra lists are either things of the past or are much abbreviated. Even in districts remote from the scene of active war preparations, suitable crew material is simply not available. Interurban lines that in the old days attracted a high class of employees are now in some cases forced to operate reduced services.

What is the solution to this problem? There is no universal answer, and in some communities no answer at all except an actual reduction in service. The injuries thus resulting to both public and railway are simply the fortunes of war, and both parties will have "to grin and bear it" the best they may. As has been noted many times before in these columns, woman conductors or one-man cars may afford the best solutions in other communities. But as in munition manufacturing districts female labor is almost as scarce as male labor and all services cannot be operated by one-man cars, neither of these proposals is a universal answer.

In some instances, notably in the shipbuilding districts, old railway men now in the shipyards assist in handling the rush-hour services. On the whole, however, to quote in substance a recent expression on the subject by a well-known operating man, the possibilities within a company are usually quite as great as any outside. In other words, the rerouting of cars to cut out dead car mileage, the changing from swing runs to straight runs where such changes will permit the regular crews to operate trippers on overtime, the use of proper cars for the service, and similar schemes are quite as productive of results from the labor standpoint as anything else.

Norfolk & Western Electrification Helping Directly to Win the War

The Fifty Per Cent Increase in the Mountain Grade Capacity of the Norfolk & Western Through Electrification Has Permitted Millions of Tons of America's Best Coal, Otherwise Locked Up, to Go to Our Ships and Shops—An Electrification in the Very Heart of a Great Coal Region Which Has Also Proved Successful in Technical and Financial Respects



THE ELECTRIC LOCOMOTIVE COAL TRAIN SERVICE THAT IS PLAYING A REAL PART IN FURNISHING THE FUEL FOR UNCLE SAM'S SHIPS

ON page 22 of the last annual report of the Norfolk & Western Railway was the significant statement that during the month of October, 1917, when conditions were normal, the cost of freight movement with electricity was 26 per cent less than if steam had been used. For amplification of the company's operating statement it is permissible to state that the electric costs included allowance for fixed charges, depreciation, maintenance of track, line, power and shops, etc.; while the steam figures covering similar charges were calculated in accordance with the rules of the Interstate Commerce Commission.

But it must be far more gratifying to the directors of the company to know that their decision to electrify has also proved of the greatest possible value in the winning of the war. For it is the famous Pocahontas coal that is used by our Navy in millions of tons, and only through electrification has it been possible to ship 50 per cent more of this efficient fuel than would have been the case under steam operation, especially during the harsh winter of 1917-1918. Thus foresight and boldness have been doubly rewarded.

As the value of electrification from an economic basis is largely that of handling a tonnage beyond a

value critical for steam, it may be pointed out that if the Norfolk & Western had been electrified in 1905, the change might not have paid; if it had been electrified in 1910, there would have been no particular saving, while on the basis of business done since 1915, electrification was absolutely the right thing.

In the case of this company, the limitations on steam were imposed by a gauntlet tunnel through which the greatest number of trains could be handled eastbound in twenty-four hours. This permitted, with trains of 3300 tons, a maximum of about 40,000 tons a day. Compare this with the nineteen electric trains hauling 61,200 tons of coal eastbound from Elkhorn Grade, as shown in the summary of train movements made on May 4, 1918, and given in Table I.

In the old days the signal operators, knowing how liable steam trains were to stall in the tunnel, would not risk blocking the tunnel when preference freight or passenger trains were due to arrive. This deliberate holding of trains at the portals increased the congestion already due to low speeds. To-day the now-so-vital coal trains are handled electrically through the tunnel directly ahead of preference freight or passenger trains.

The importance of the Norfolk & Western Railway as a coal carrier may be gaged by the fact that in October, 1917, it carried in the electric zone 45,390,554 ton-miles of freight (mostly coal) and only 495,860 ton-

NOTE: Earlier articles in this paper to the Norfolk & Western Railroad electrification will be found as follows: Vol. 42, pages 149, 298, 680; vol. 42, page 795; vol. 45, pages 581, 1058; vol. 47, pages 311, 322, 419, 453, 644; vol. 49, page 524.

So far as actual running is concerned, the steam locomotives were at a tremendous disadvantage on the heavy grades, where they averaged about 7 m.p.h., and in the tunnel the speed was as low as 4 to 3 m.p.h. The consequence was a piling up of trains outside the tunnel, many drawbar and knuckle failures due to low speeds, and a host of worries for the dispatching department.



NORFOLK & WESTERN POWER STATION

With electric operation the locomotives go up the grade and through the tunnel at the constant speed of 14 m.p.h. This has absolutely eliminated congestion and simplified dispatching wonderfully. In fact, in the words of the chief dispatcher: "Electric locomotives are as superior to steam as telephone dispatching (also used by this railway) is superior to telegraphic dispatching. Electrification plus telephone dispatching now enables six men to handle one-third more business with more ease than twelve dispatchers handled the old combination of steam and telegraph." Evidently the best boosters for electrification are the electrified!

The steam crew used to go out of Bluefield with two Mallet engines and added a Mallet pusher for 3300-ton loads between Eckman and Ruth. The electric crew goes out with but one engine for the same number of empties and adds a pusher for a load of 3300 tons. In other words, for the empties the ratio was two steam to one electric; for heavy loads, two electric locomotives were used as compared with three steam.

ELECTRIC ENGINES HAVE AS LITTLE AS THIRTY MINUTES' TURNING TIME

Another important reason for the superiority of electric operation is the decrease in standing time. An electric engine is allowed but forty-five minutes terminal turning time, for change of brakeshoes, journal inspection, etc.; everything in excess of that period is charged as "delay"; if need be, they are turned in thirty minutes. On the other hand, Mallet locomotives in the same service averaged ten hours terminal turning time—a ratio of 13.33 and 20 to 1!

The maximum tonnage per train varies, of course, with the profile. Where the ruling grade is 2 per cent, a train of 3300 tons with two locomotives is the standard. On the eastern slope where the ruling grade is 0.3 per cent, maximum loads of 4800 tons are permissible, while on westbound trip with a ruling grade of 1 per cent,

TABLE III—SHOWING DETAILS OF DELAYS TO ELECTRIC LOCOMOTIVES

	Abstracts from Monthly and Semi-Monthly Reports			
	1918 All Feb.	1918 J. 15-31	1918 J. 1-15	1917 D. 15-31
Total delays	66	12	23	25
Total delays, minutes	1,994	115	434	530
Delays due to mechanical and electrical defects	62	12	22	21
Minutes delay for mechanical and electrical defects	1,677	115	434	486
Average minutes delay	30	9½	19	23½
Minimum delay, minutes	3	2	2	2
Maximum delay, minutes	138	20	100	140
Eastbound, trains over Elkhorn Grade	341	175	127	155
Elkhorn crews reporting	307	149	170	143
Pusher trips	272	391	311	328
Pusher crews reporting	176	102	108	65
Average number of trips per crew	4½	4	3	5
Total engine-hours	6,009 h-50m	3,119 h-55m	2,720 h-12m	2,794 h-56m
Total engine delays due to electrical and mechanical defects, minutes	1,877	115	434	486
Per cent of total engine hours delay	0.5	0.06	0.26	0.28

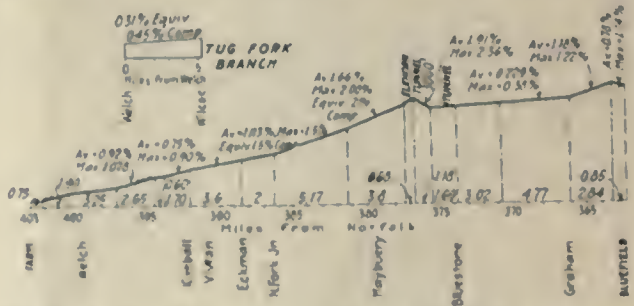
3000 tons is the limit. The latter loading is rarely attained in operation, as the principal loads are trains of empties which would not exceed 2000 tons with 100 cars.

ELECTRIC ENGINE-HOUR LOSS LESS THAN ONE-HALF OF 1 PER CENT

To speak generally, it may be said that the loss of engine-hours due to electrical and mechanical defects of locomotives is usually within the remarkably low figure of one-half of 1 per cent. As shown in Table III the performance for the period of Jan. 15-31, 1918, six-hundredths of 1 per cent, is simply astounding for winter service over mountain grades.

An examination of the detail records of defects and their character discloses the somewhat unexpected fact that the most novel part of the equipment—the phase converter—is also the most rugged. In fact, the mechanical parts have given more concern than the electrical parts, because of the extremely heavy service. To-day a large portion of the mechanical defects are due to plain wear. It is impracticable to go into the details of the experiences with these locomotives from the beginning, three and a half years ago. It may be observed here, however, that a general overhauling of these engines is carried out only once a year; and the pantograph shoes (sheet steel) are good for 10,000 to 12,000 miles or say quarterly replacements.

The power plant is located at Bluestone, 11 miles from Bluefield. This is not the center of the power load but



PROFILE OF THE NORFOLK & WESTERN ELECTRIFICATION, INCLUDING THE TUG FORK BRANCH

had to be chosen because it was the only place that had enough water for condensing purposes.

To the original installation of three 11,250 kva. Westinghouse turbo-generators there has been added a fourth unit alike in all respects except that the condenser pump is electrically driven to improve steam balance on light loads. This addition, of course, is to take care of the

extension. The boilers now comprise twelve instead of ten B & W Stirling units of 677 hp. each.

The transformer substation locations and equipments, varying according to grade and load conditions, are as follows:

No. 1—Bluefield station, between Bluefield and Graham for 1.22 per cent grade, two 3000-kva., 44,000/11,000-volt transformers.

No. 2—In the Bluestone power house, for 0.4 per cent grade, two 3000-kva. transformers.

No. 3—Maybeury, for 2 per cent grade, two 5000-kva. transformers.

No. 4—North Fork, for 1½ per cent grade, two 4000-kva. transformers.

No. 5—Vivian, the extreme western end of the present electrification, for 1 per cent grade, two 2000-kva. transformers.

No. 6—Substation to be built at Welch for the extension, two 3000-kva. transformers.

POWER LOAD DISPATCHING INAUGURATED

Until recently an electric locomotive picking up fifteen to twenty cars at a time on sidings for train make-up was out of touch with headquarters. To secure more effective operation and better load factors, a portable telephone system has been installed whereby the power director is informed by the conductor or the engineer of the leading locomotive that the train is full and ready to start. The train dispatchers are not advised by the power director unless the train is to be held say more than ten minutes.

These telephones are at the various stations, starting in order from Graham, Flat Top, Bluestone, Maybeury, North Fork, at various coal operating or outlet tracks, at Eckman and at Vivian. There are three power directors, each working an eight-hour trick.

The desirability of this load dispatching may be appreciated by stating the coal-loading conditions. There is a large yard at Vivian and a still larger one at Eckman, at which end is also the heaviest grade—the 2 per cent rise beginning at Ennis. An engine originating at Bluefield, the eastern end, will go westward either with trains

IV. This summary shows that on that day nineteen trains handled 789 loads, totaling 61,200 tons.

That the Norfolk & Western is as progressive in its steam activities as in electrification may be shown by citing a few of the things that it is doing, such as the following:

Construction of steel frame and wooden side coal cars.



CLOSE-UP OF THE NORFOLK & WESTERN LOCOMOTIVE

Completion of sixteen, home-designed and home-built, locomotives (incidentally the largest passenger locomotives in the world) during the first four months of 1918.

Development and construction of 1750 of the largest coal cars ever made. These cars carry 100 tons net.

Installation of electric furnace for steel castings.

Ordinarily the company designs and builds all of its freight cars and such engines as shop room will permit.

To-day, the company has in use approximately 180 Mallet engines and has recently bought another fifty because of the tremendous pressure of business.

Compressed Air Society Adopts Definitions to Eliminate Confusion

UPON recommendation of its technical committee the Compressed Air Society, 30 Church Street, New York City, has adopted the following definitions of certain compressed-air terms in order to eliminate confusion as to their exact meaning:

Displacement—The displacement of an air compressor is the volume displaced by the net area of the compressor piston.

Capacity—The capacity should be expressed in cubic feet per minute and is the actual amount of air compressed and delivered, expressed in free air at intake temperature and at the pressure of dry air at the suction.

Volumetric Efficiency—Volumetric efficiency is the ratio of the capacity to the displacement of the compressor, all as defined above.

Compression Efficiency—Compression efficiency is the ratio of the work required to compress isothermally all the air delivered by an air compressor to the work actually done within the compressor cylinder as shown by indicator cards, and may be expressed as the product of the volumetric efficiency (the intake pressure and the hyperbolic logarithm of the ratio of compression), all divided by the indicated mean effective pressure within the air cylinder or cylinders.

Mechanical Efficiency—Mechanical efficiency is the ratio of the air indicated horse-power to the steam indicated horse-power in the case of a steam driven, and to the brake horse-power in the case of a power driven machine.

Over-all Efficiency—Over-all efficiency is the product of the compression efficiency and the mechanical efficiency.

TABLE IV.—SUMMARY OF LOG SHEET FOR TWENTY-FOUR HOURS ENDED 11:59 P.M., MAY 3, 1918

Eastbound extras from Elkhorn grade.....	19 trains, 789 loads, 61,200 tons
Eastbound time freights.....	2 trains, 83 loads, 3,526 tons
Eastbound from Pocahontas.....	2 trains, 89 loads, 6,300 tons
Eastbound from Clift yard.....	3 trains, 145 loads, 11,200 tons
Westbound time freights.....	0 trains, 0 loads, 0 tons
Westbound extras 12-C. L.....	12 trains, 767 cars, 18 West loads
Hill crew trips from Elkhorn grade, 21.	
Hill crew trips from Flat Top to Bluefield only, 0.	
Pusher trips, 34.	
Hill crew reported, 10.	
Pusher crew reported, 7.	
Loads delivered to Radford Division, 1035.	
Eastbound loads on Pocahontas Division, 1916, including 725 at Bluefield and Elkhorn, 285.	
Engine hours at full tonnage, 181 hours, 58 minutes.	
Engine hours at reduced tonnage, 26 hours, 05 minutes.	
Number of trains with reduced tonnage, 2.	
Weather	Time
	7:00 a.m. to 3:00 p.m.
	3:00 p.m. to 11:00 p.m.
	11:00 p.m. to 7:00 a.m.
	Power Directors

of empties for delivery to the mines; or the engine may leave Bluefield light westbound, and pick up loaded cars at Flat Top yards and take them through to Eckman or Vivian. On the return trip, when the train has been filled out to capacity, the power director is advised that the train is ready to move.

All information is recorded on a log sheet, of which the summary for May 3, 1918, is reproduced in Table

Some Pitfalls in Regulating Depreciation

In Determining Past Investment Commissions Should Adopt a Reasonable Depreciation-Deduction Rule Regardless of Subsequently Used Methods of Computing Depreciation—Future Deductions in Rate Cases, However, Depend Upon Financial and Accounting Policies Followed

BY JOHN BAUER

Princeton University

THE Colorado Public Utilities Commission recently laid down a rule on depreciation and valuation which should be subjected to very careful analysis, because it threatens to become a bad precedent in rate valuations.¹ The commission states that allowance should be made among operating expenses for depreciation or replacement of property, but that the deduction of past accrued depreciation from the appraisal for rate purposes depends upon whether the depreciation allowance in the operating account is based upon the sinking-fund or the straight-line method.

If the depreciation allowances are determined by the sinking-fund method, then the earnings of the fund (so the argument runs) are credited to the depreciation reserve and to that extent relieve the consumers from paying directly for replacement of property. No deduction, therefore, should be made from the appraisal for depreciation. But, if the allowance is computed on the straight-line theory, then larger charges are made to operating expenses for depreciation, and the earnings of the fund are not credited to the reserve. In order, therefore, not to place larger burdens upon consumers than by the sinking-fund method, the depreciation reserve should be deducted from the appraisal.

A careful analysis of this opinion is worth while because of the tremendous effort that is being made by public service corporations all over the country to secure the adoption of the principle that past accrued depreciation should not be deducted from cost new of property valued for rate purposes. The opinion goes a long way toward granting the companies' contention, and it is likely to be used as a leading precedent for their purpose. Much of what is said is excellent, but the issues are not so simple as they are represented. The principle involved is so important that no unwarranted conclusion should go unchallenged. A proper analysis has importance, therefore, far beyond the particular case at issue.

The proposition regarding the different handling of the depreciation item under the sinking-fund and straight-line methods might be satisfactory enough, if the uncertainty of past investment were cleared up and if the proper accounting and financial policies were enforced. If the investment entitled to a fair return were once determined, the commission's distinction might be properly followed for the future, but even that would depend on the precise accounting and financial methods followed. For the past, however, when the amount of the investment is uncertain, when the accounting methods have been unreliable, when no fixed financial policies were pursued and when rates to

consumers were not based upon cost but were fixed according to what the traffic would bear—when, in short, there were no clear methods of regulation, the commission's view is palpably wrong. The following analysis makes a clear-cut distinction between cases involving past uncertainties and those based upon ascertained facts and involving definitely prescribed future methods of regulation.

HANDLING OF THE PAST MUST BE BASED ON REASONABLENESS

Let us consider, first, the commission's view from the standpoint of cases that require the clearing up of facts before definite regulation may be attempted. Apparently the particular case before the commission was of this sort—there was uncertainty as to the investment, there had been no definite method for providing for depreciation or renewals and the rates had not been based on any clear regulatory system. An appraisal was made of the property, with the usual difference between the company's figures and those of the commission, and the fair value was finally placed at approximately \$140,000. In arriving at this amount, the commission considered that the "annual depreciation requirement will be determined and set aside on the sinking-fund basis, and has, therefore, in accordance with the principles hereinbefore announced, made no deduction on account of accrued depreciation."

The purpose of the appraisal was to determine the investment on which a return should be allowed. For the future no appraisal will be required for any subsequent rate determination, provided the commission sets up a definite depreciation and financial policy and institutes the proper accounting control for the purpose. But before such an automatic procedure may be established, past uncertainties must be cleared up, and, especially, a fair investment figure must first be determined. This is the sole object of a physical appraisal. The valuation merely furnishes the starting point for any future automatic control of rates and return on investment. Why, then, should the future particular method of providing for depreciation have any bearing on determining the valuation? Are the reasonable present claims of the investors against the public any different whatever future depreciation policy may be adopted? Why should investors get more or less, whether the sinking-fund or straight-line method be employed? Are they not entitled to a fair return on a fair valuation? Should that not be the same by whatever way depreciation may hereafter be computed?

The precise future treatment of depreciation in any comprehensive plan of regulation is principally a question of apportioning operating costs among consumers; it is not a factor in the valuation. The straight-line

¹The City of Lamar, Col., vs. The Intermountain Railway, Light & Power Company.

method places relatively larger renewal costs upon the consumers during the early years of the property, while the sinking-fund method provides ideally for an equal annual distribution; but the investors are not interested in this, provided they get a fair return on their investment. In other words, they are entitled to a return on an amount determined independently of the method by which renewal costs are borne by the company's consumers.

In determining past investment, then, the commission should adopt a reasonable rule independent of any future operating policy. Various rules may be adopted, each having its own special advantages and disadvantages. First, there is the choice as to whether reproduction cost or actual installation cost should be used; and, second, as to whether or not a deduction should be made for depreciation. But, once more, the deduction for depreciation has nothing to do with the policy of future provision for renewals. It is merely a question whether in clearing up past investment any allowance should be made for physical condition of the property due to wear and tear, obsolescence and inadequacy. It is a question of reasonableness, and nothing more. No matter how future depreciation be treated in the operating account, would it make sense to fix the same basis of return to the investors whether the property is new, up to date and in every way suitable for its purpose, or whether it is old and worn and is extensively obsolete and inadequate? The inventory, of course, would be identical, but should the valuation or investment be counted the same? Is not this the essence of the problem of whether depreciation should be deducted from cost new in an appraisal? If so, does it depend in the least on the method by which depreciation may be computed hereafter?

HOW THE FUTURE DEDUCTION OF DEPRECIATION IS DETERMINED

As for the future, when we start with a definite rate base on which a fair return should be allowed, then, it is true, in keeping the rate base up to date there is a question whether the depreciation reserve should be deducted from cost new of the property. Even so, however, the deduction does not depend altogether on whether depreciation is computed by the sinking-fund or the straight-line method. It depends rather on the precise accounting and financial policy that may be required by the commission and followed by the corporation. The fundamental consideration should be that investors get a fair return on their ascertained investment and no more.

Let us assume that for the future a company is entitled to a fair return on its fair known investment, and that the sinking fund method of providing for depreciation is used. This usually assumes that for all depreciable property an equal annual sum is paid into a fund, which together with interest at a given rate will furnish sufficient funds for all future renewals. Suppose that the investment (as in the particular Colorado case) is \$140,000, that the equal annual sinking-fund allowable for depreciation is \$5,000 and that the investment remains unchanged so that the company is regularly entitled to a return of 6 per cent on \$140,000. The usual accounting procedure would be to charge \$5,000 a year to operating expenses for depreciation,

credit the amount to the depreciation reserve and then set aside \$5,000 cash in a special depreciation fund; then also to credit the interest earnings to the depreciation reserve and add the cash to the depreciation fund. The depreciation reserve and the corresponding fund would then always be equal; the two must not be confused.

Now, should the depreciation reserve be deducted from the cost new of the property? The Colorado Public Service Commission says "No!" This view is correct if the depreciation funds themselves are not included in the property. But if they are included in the property, the reserve should be deducted, or the investors will get a return also on the depreciation funds contributed by consumers through the rates paid for service. The investors are entitled to a fair return on \$140,000 and no more.

The foregoing is the usually assumed procedure when the sinking-fund method is used, *i. e.*, that the funds are accumulated with interest and are used only for renewals, and that the depreciation fund and the depreciation reserve are equal. But the sinking-fund method may be used without the accumulation of cash funds for renewals equal to the accrued depreciation reserve. The essence of the method is merely that property be written down through credits to the depreciation reserve at an increased annual amount (increasing at a fixed rate); the funds themselves may be used for any corporate purpose. The important thing is that money be kept in the business through charges to income; it may better be used for additions and improvements to the property than be kept exclusively for renewal purposes.

In such cases, where under the sinking-fund method the funds are put into improvements, obviously the property is built up out of the contributions by the consumers, and the full cost of the property will exceed the company's investment of \$140,000 by the amount of the depreciation reserve. It will be necessary, therefore, to deduct the depreciation reserve from the cost of the property, even though the sinking-fund method of computing depreciation is used.

There are other variations in procedure that may be followed in connection with the sinking-fund method; and whether the depreciation reserve should be deducted from the cost of the property to show the investment, will depend upon the special circumstances. In any case, however, the investors should receive a return on their actual investment of \$140,000, regardless of the precise accounting and financial plan by which the property is maintained.

Likewise, if depreciation is computed by the straight-line method, the commission's rule that the reserve should be deducted from cost new cannot be followed indiscriminately. The straight-line method assumes that the cost of property is charged off to operating expenses and credited to the depreciation reserve in equal annual amounts during the life of the property. But beyond this general statement, the exact procedure may be of a varied character. The money retained in the business may be put into new property, or it may be set aside into a special renewal fund. If it is put into property, the earnings are necessarily merged with the general operating revenues and clearly the depreciation reserve should be deducted from the cost of the

property to show the company's investment of \$140,000.

If, however, special renewal funds are kept, the deduction of the depreciation reserve depends upon the accounting of the interest earnings from the funds; in any event, the funds are contributed by consumers and should go to their benefit. If the earnings are included in the operating revenues to relieve the consumers through the rates for service, then the reserve should not be deducted—unless the funds too are included in the property. But if the earnings are not included among the operating revenues but go to the investors as non-operating income, then the depreciation reserve should be deducted from the cost of the property; otherwise, the company would get the full return on the investment of \$140,000, and besides would get the interest from the funds contributed by the consumers. Finally, if the funds themselves are listed with the property, the interest should go to operating revenues and the reserve should still be deducted from the property.

ULTIMATE TEST IS FAIR RETURN AND NO MORE

The test should always be that the investors get from the consumers a fair return and no more. The investment in the particular case is placed at \$140,000; this should be maintained by the public and should not be changed by any particular method of providing for renewals.

There are many pitfalls in the proper treatment of depreciation in a comprehensive plan of regulation. The Colorado Public Service Commission has evidently fallen into several at the same time. The serious one is the confusion between clearing up past investment and other financial uncertainties, and setting up a definite policy of control for the future. The view is almost absurd that any deduction for past depreciation in a rate case should depend on the future method of computing depreciation for operating purposes. Yet it is exactly this general view that is being vigorously urged by utility interests for the sake of establishing a larger rate base.

When the investment has once been determined, the method whereby depreciation is computed, how the funds are kept and how the revenues are treated in the future deduction of the depreciation reserve from the cost of the property does depend on the particular accounts. But the future method of treating depreciation in the operating account simply has no bearing on the reasonable determination of the investment entitled to a return when a company is first brought under a plan of regulation.

Women as Station Agents in Japan

The Mino (Japan) Electric Railway, reported recently in the *ELECTRIC RAILWAY JOURNAL* as experimenting with the employment of women conductors, has gone a step further in deciding to appoint women "station-masters" in future at all stations of the line. Most of the women employees in the service of the railway are young girls about twenty years old, and complaints are already beginning to be heard from the male operatives who are annoyed to receive orders from girls of such tender age.

An Interurban Bus That Pays

Seattle-Bothell Bus Line Eliminates Competition After Three Years of Consistent Service—Three Other Lines Previously Abandoned

SOME years ago when Stone & Webster interests in Washington were confronted by the problem of giving transportation in certain territories too sparsely peopled for a railway, they undertook operation with auto buses. For this purpose a separate corporation—the Washington Auto Bus Company—was formed with no railway connections except a transfer arrangement at Seattle with the Puget Sound Traction, Light & Power Company. Even this was abolished as early as Aug. 1, 1917, because passengers preferred to stay on the buses instead of transferring to street cars at Cowen Park, 5 miles from the center of Seattle. As a matter of fact, this arrangement during the twenty-two months it lasted cost the bus company \$2,731.55, which was 7.6 per cent of its gross receipts. The buses now come down to the upper business district at Fifth Avenue and Pine Street, which is also the terminus of the Seattle-Bothell interurban railway.

The origin of the bus service was described in the Sept. 18, 1915, convention number of the *ELECTRIC RAILWAY JOURNAL*; a description of the several types and makes of buses bought appeared in the same article, followed by a detailed story on Jan. 22, 1916, on the three Brill buses with International Motor Company's 2-ton Mack chassis which are still in use. A second review of operating results appeared in the Aug. 4, 1917, issue.

The following tells the story of the sole bus survivor after December, 1917, out of the four routes tried. This is the Seattle-Bothell line, which began operation on Nov. 15, 1915. Through consistent, excellent service



ONE OF THE 2-TON BUSES ON THE SEATTLE-BOTHELL LINE

it has secured the field to itself. Rival buses disappeared in June, 1916, but a few jitneys held out until October, 1916. It was not before May, 1918, that the company had wiped out early losses and could show \$300 on the right side of the ledger.

The Seattle-Bothell line is 16 miles long. It is favored by excellent roadway conditions, the 16 miles being

made up of 5 miles of brick or asphalt within Seattle, followed by 7 miles of Warrenite asphalt and 4 miles of brick. This accounts for the fact that the pneumatic front tires average 10,000 miles, equivalent to 0.83 cent per mile per wheel. The solid block tires for the rear wheels averaged 7000 miles, equivalent to 1.8 cents per mile per wheel. Thus the total tire cost per mile per bus was $2 \times 1.8 + 2 \times 0.83$ or 5.2 cents.



THE BUS OPERATOR RECORDS FARES ON AN ORDINARY CASH REGISTER

As the solid tires did not give sufficiently smooth riding they have been replaced by pneumatics. The buses have a maximum speed of 25 m.p.h., and an average schedule speed of 20 m.p.h. The average gasoline consumption is 1 gal. for every 7.4 miles.

A pleasant surprise was the sturdiness of the buses in this service. This is indicated by the fact that depreciation is now on the basis of a four-year life instead of three. Consequently the allowance for four buses is now \$338.55 instead of \$470 a month.

The present equipment comprises the original three 2-ton Mack chassis machines, a 1-ton Mack added in July, 1916, and intended only for double-heading but actually used as a regular, and a fifth 2-ton bus of the same type. All buses seat twenty riders. The 1-ton bus displaced an inferior vehicle of other make. These twenty-seat buses were bought f.o.b. Seattle at \$4,600 each or \$230 per seat. One would cost now at least \$5,500.

Judging from the weights of these machines, bus designers appear to take more pains to save gasoline than many car designers of the past (and some of the present) do to save electricity. Although these buses have to carry their own generating plant, their weight per seat ranges from 335 lb. to 395 lb. only.

One reason why the company is able to show satis-

factory results is that it can get a reasonable rate of fare. To take care of increased costs it raised its rates 8 per cent (in addition to the 8 per cent war tax) on Feb. 1, 1918. This makes the cost per mile as follows: One-way, 2.75 cents; round trip, 2.30 cents; ten-ride commutation, 1.75 cents.

The increased rate has raised the average return per bus passenger from 20 to 22 cents. Fares are recorded on a special locked type of the National Cash Register Company whereby the total and number of fares of every class are printed on a tape.

The buses are run at any headway necessary to meet traffic, the range being from fifty minutes down to two and one-half hours. The seat-use factor since competition ceased is high—85.5 per cent. In winter 300 to 350 passengers are carried every day; in summer 400 to 500. Between October, 1917, and February, 1918, travel increased 21.4 per cent and receipts rose 27.8 per cent.

One other factor besides those named has had a big part in making the auto-bus a success—and that is the use of but one operator per bus. Up to April 1, 1918, such operators received 50 cents per trip. Now they get 60 cents. A trip covers fifty-five minutes exclusive of layover. Curiously enough, the Puget Sound Traction, Light & Power Company did not have its one-man safety car operation approved so readily although less skill is required to pilot a street car.

Detail bus figures follow:

STATISTICS OF MOTOR BUS OPERATION, SEATTLE-BOTHELL ROUTE, 16 MILES

	1917	1916
Bus-miles.....	134,352	113,040
Revenue from operation.....	\$27,032.56	\$19,213.29
Operation expenses.....	\$21,045.11	\$16,551.44
Depreciation.....	\$4,142.24	\$5,193.30
Taxes (covering 1916 operation).....	\$126.24	.....
Total.....	\$25,313.59	\$21,744.74
Deficit.....	.....	\$2,531.45
Surplus.....	\$1,718.97	.....

On the basis of the bus-mile unit, receipts in 1916 averaged 17 cents and in 1917, 20.12 cents. Operating expenses including depreciation dropped from 19.23 cents in 1916 to 18.84 cents in 1917, but excluding the reduced allowance for depreciation the operating expenses for 1917 were 15.66 cents per bus-mile against 14.64 cents in 1916.

B. R. T. Employees Active in War Thrift Movement

In a little more than three months of organized War Savings activity the employees of the Brooklyn Rapid Transit Company have bought more than \$50,000 in Thrift and War Savings Stamps. During the month from June 15 to July 15 alone a record of \$17,416.21 was made, against \$13,580.01 for the month previous. Strong war savings societies have been formed in the transportation departments and the mechanical department. In these approximately 85 per cent of the employees are regularly enrolled in societies. The management of the company has at present arranged to lend to the Brooklyn War Savings headquarters the services of Charles W. Roberts, of the legal department, in districts that have not been satisfactorily covered thus far.

The *Pioneer Bulletin*, published by the commercial, industrial and professional divisions of the War Savings Committee of New York in the interest of the local campaign, contained recently an article complimenting the company upon the excellence of the results obtained.

Traffic Problems Confront the Rose City

Return of Jitneys Is Threatened in Portland, Ore.. Because of 6-Cent Railway Fare in Jitney Zone—Platform Shortage Is Keeping Company Astir

ON MAY 17 the citizens of Portland, Ore., indicated their disapproval of the 6-cent fare, granted by their own State Public Service Commission and approved by their own courts, by voting for the return of the jitney. First, they reduced the bond per jitney from \$2,500 to \$1,000 and adopted the device of a blanket bond of \$10,000 for 100 jitneys in the name of the Jitney Drivers' Union. Second, they failed to pass more definite restrictions as to service continuity and the like.

In spite of these acts, however, one driver on June 13 stopped operating the Linnton suburban bus line rather than have the expense of filing a bond on top of the losses suffered by his disgusted predecessor. Nor

the real danger of the jitney's returns at Portland or elsewhere.

Many a present restrictive ordinance may be wiped off the books in a great wave of unreasoning sympathy for the unemployed—unreasoning because the jitney man's gain is the platform man's loss, regardless of the economic waste of the jitney itself. Therefore the electric railway must be able to win out on the basis of giving a service that will keep out the jitney—ordinance or no ordinance. This means two things: (1) Shorter headways at higher speeds due to smaller one-man cars of fewer stops and higher acceleration and braking rates; (2) short-haul fares which do not exceed that of the jitney.

HOW THE JITNEYS LAPPED OFF THE CREAM

The recent capable, though unsuccessful, campaign against the return of the jitneys in Portland revealed interesting conditions. In a letter to the electorate on May 11, the Portland Railway, Light & Power Company pointed out that electric railways, on a single-fare basis, had to take the lean with the fat. This put them at a great disadvantage with the jitneys, which merely went after short hauls in the densest territory. This statement was backed up by a map.

For the convenience of ELECTRIC RAILWAY JOURNAL readers, this map in reproduction here has been amplified to show by surrounding lines how carefully the jitneys running in June, 1917, kept away from both outlying and hilly sections. In two districts a service with big buses was tried and voluntarily given up, except that a few jitneys ran into part of one district for short hauls. Where there were hills, even a short haul could not induce the jitney to come out. One would suppose that a map like this would convince anybody with eyes to see and a brain to judge. Nevertheless, the pro-jitneyites won by a big majority in every district except those where large numbers of platform men live.

The map shows clearly the relationship between the 5-cent jitney area and the 6-cent railway area, which really runs beyond the city boundaries. About 15 per cent of the railway riders actually pay only 5½ cents, using fifty-ticket books sold for \$2.75, while 1½ per cent have 4-cent school tickets, sold twenty-five for \$1. In general, the jitneys formerly drew travel from within a 2-mile to 3-mile well-populated zone, while the electric railway was graciously permitted to carry people three times that distance at 5 cents or less.

THE PUBLIC DOES NOT UNDERSTAND

It is evident from the foregoing facts that if the Portland company had retained the 5-cent fare for all or a greater part of the jitney zone, there would have been no desire to bring back the jitney, since the suburbanites knew perfectly well that they could expect no help from that irresponsible and non-philanthropic vehicle. In fairness it should be added the railway management simply put it up to the commission to grant relief, and it would have been satisfied with any course that produced such relief.

The Portland management is cognizant of the advantages of the safety car for beating the jitney. Twenty-five have been ordered.

While it is true that despite the 6-cent fare effective



HOW RAILWAY AND JITNEY SERVICES IN PORTLAND COMPARED IN JUNE, 1917

had the Jitney Drivers' Union come through with its \$10,000 bond by June 14, nearly one month after the passage of the ordinance.

Of course, with 36,436 men reported in Portland shipyard service on June 15, it is not likely that the jitney will reappear in large numbers during the war boom, for only the most short-sighted "ne'er-do-well" would run a jitney to earn a precarious living in eighteen hours when he could readily make twice as much money in one-half the time. Yet one should look beyond the period of the war when thousands of men may be glad to get anything to do. Herein lies

since Jan. 15, 1918, traffic has risen 20 per cent compared with a year ago and receipts 44 per cent (this discrepancy is due to the 6-cent fare and to increases in the 15-cent Vancouver line), one must not overlook the influence of the enormous activity and great influx of industrial population. This great increase in receipts is practically offset by increase in operating expenses due to the great advance in wages in all departments and the much higher cost of all material entering into maintenance. This prosperous condition also beclouds the issue, whereas the pro-jitney vote has the potentiality of great harm, for it shows the public misunderstands.

Probably the real increase in business is greater than the figures show, for even with a wage scale ranging from 38 cents to 45 cents an hour, the company cannot hold its men. Because of the frequent necessity for overtime, some carmen are earning in excess of \$200 a month. Still, what's that alongside the honorarium of a champion riveter?

The conditions in this great shipyard city are difficult to describe. About 50 per cent of the men have resigned within the year, so that to-day about 600 men are new hands. In the meantime, there has been the need of meeting a base schedule of 175 cars and a rush schedule of 450 cars. Under the circumstances the company considers itself fortunate that the schedule speed has dropped only from 9.52 m.p.h. to 9.35 m.p.h. Doubtless the sale of tickets, including the five-for-30-cent kind, has helped to avoid the great increase in car-hours which may follow the use of an odd-unit fare.

The case of Portland—5-cent short-haul jitney versus 6-cent long-haul trolley—certainly indicates how electric railways lay themselves open to loss through subsidizing the suburbanite. What makes the long-haul situation at 5½ to 6 cents even worse is that so many suburbanites use private automobiles, especially for the mid-day shopping.

It is safe to prophesy that if the short-haul rider gets a 5-cent fare in the faster automatic-type one-man car, while the suburbanite is made to pay for the long haul through thin territory, jitneys would neither be invited to return by a majority nor find it possible to live if they did return.

Real Rapid Transit for Ship Workers

Five-Car Train Operation Over the Lines of the Pacific Electric Railway Gives a High-Grade Service—First Train Out Two Minutes After Whistle

THE great superiority of train over single car service in handling shipbuilding traffic is demonstrated by the comparative ease with which the Pacific Electric Railway is taking care of the heavy increase in traffic to San Pedro, the harbor of Los Angeles, Cal. As San Pedro itself has little housing accommodation, most of the workers come from Los Angeles, 22½ miles distant, and from Long Beach, 8½ miles away, with a few from Redondo via the San Pedro-Torrance line.

There are four shipyards in the San Pedro section: The Los Angeles Shipbuilding & Drydock Company, which is building eighteen 8800-ton steel vessels; the Fulton Shipyards, which is building wooden boats at Wilmington; the Chandler Shipbuilding Company,

which is also building wooden ships, and the latest comer, the Southwestern Shipbuilding Company, which has a contract for ten 8800-ton steel vessels. The last-named company is on an island reached by ferry from San Pedro.

VARIED WAR SERVICE GIVEN

Not all of the traffic is from shipbuilders, for besides these and the ordinary local riders there are many soldier and sailor passengers, on account of the presence of Fort MacArthur and a naval reserve station.

An idea of the character of travel may be gained from the following figures for June 3:

Out of Los Angeles between 5.20 a.m. and 6.51 a.m., 4066 passengers in seventy-one carloads.

Out of Long Beach between 5.50 a.m. and 7.10 a.m., 1724 passengers in thirty-two carloads.

Via San Pedro-Torrance line, 219 passengers.

Returning from San Pedro to Los Angeles between 3 p.m. and 9.45 p.m., 5485 passengers in 104 carloads.

Returning from San Pedro to Long Beach between 3 p.m. and 7.15 p.m., 2087 passengers in forty-two carloads.

The speed with which the cars are boarded and sent off is indicated by the fact that on June 3, fifty-one cars were observed to pass the Wilmington substation at San Pedro in fourteen minutes. From the blowing of the whistle at 5.45 p.m., it is just two minutes to the departure of the first train! The maximum train length is five cars, this limit being set by the type of air brakes.

Fares are paid in tickets, both commutation and excursion. A ticket office has been built at the plant of the Los Angeles Shipbuilding & Drydock Company.

Within a year, comparing April, 1917, with April, 1918, the number of passengers on the Los Angeles-San Pedro line has risen from 123,000 to 434,000 and on the Long Beach line from 46,000 to 155,000. These lines have regularly had a thirty-minute service, but this is now reinforced by longer trains and specials as required.

POWER AND TRACK FACILITIES ADDED

In order to handle this business properly, the company enlarged both its power and its track facilities. In the first place it concentrated three portable substations (two 600-kw. and one 1000-kw.) along the line, and it has ordered two 1000-kw. General Electric rotary converters and one 1000-kw. Westinghouse motor-generator set to be delivered early in 1919. These will be operated as automatic equipments. At the Wilmington substation there is now a 1000-kw. motor-generator set automatically operated.

The trackage at San Pedro was increased by building 1450 ft. of storage track with inspection pits, and also by installing 1650 ft. for freight-house use. Curves totaling 6500 ft. were double-tracked between Long Beach and Wilmington, and three-position all-electric block signals were taken from less busy lines to add to the protection of this one. The company also placed 3030 ft. of second track on the Gardena-San Pedro line in San Pedro, to be used not only for transporting the 4000 employees of the Los Angeles Shipbuilding & Drydock Company but also for carrying construction material.

Owing to the increased travel on these and other lines, the company has purchased a number of used cars of fast suburban type, nine from San Diego and two each from Visalia and Fresno.

Electric Railway Executives Confer in New York

Meet on Short Notice at Call of American Association to Consider Grave Problems Incident to War-Time Operation of Properties — Executive Committee Decides to Omit Atlantic City Convention

IN RESPONSE to the general call to electric railway executives issued last week by the executive committee of the American Electric Railway Association a large number of men occupying the highest positions in the industry and representing electric railways from all over the country held a conference on Aug. 22, at the United Engineering Societies Building, New York City. The object of this conference was to consider the recent decisions of the National War Labor Board and their probable effect on the electric railway industry as a whole. President Stanley presided at the conference.

Philip H. Gadsden, resident member of the Electric Railway War Board at Washington, discussed in considerable detail the work of the board in connection with the recent hearings of the National War Labor Board. He took up also the work now being carried on in Washington in an effort to set before the proper governmental officials the present serious condition of the electric railway industry.

Mr. Gadsden said that the work of the board had been hampered by lack of accurate data relative to the financial and operating conditions of the electric railways, both as an industry and as individuals. He advocated a stronger organization of the railways in order that the benefits of co-operation and the uniform presentation of cases before federal boards and regulative bodies be secured. He also pointed out that only by mutual assistance can anything be accomplished.

WAR BOARD WANTS ACCURATE DATA

Regarding the questionnaires sent out to a number of railways in the spring for the purpose of furnishing working data for the board, Mr. Gadsden stated that more than 150 were returned to the board. An analysis of these made by the research committee attached to the staff of the Director-General of Railroads shows that during the current year the net revenue applicable to the payment of dividends has, for the industry as a whole, practically reached the zero point. The data for this analysis were collected before the National War Labor Board decisions were made. If applied to the whole industry these would increase the annual operating expense by \$100,000,000 more for labor alone.

A new questionnaire is now being sent out to all of the 1260 electric railway companies of the country and Mr. Gadsden urged emphatically that the forms be filled out and returned to the War Board with the utmost expedition.

With the regard to the present critical situation, an increase in fares is by no means a universal remedy, the available data indicating that in most cases an increase in fare is accompanied by a decrease in volume of traffic, so that a 20 per cent increase in fare may not

result even in a 10 per cent increase in gross revenue. The situation calls urgently for federal aid of some kind or other if the electric railways are not to be doomed.

CONVINCING TESTIMONY THAT THE SITUATION IS CRITICAL

In the discussion that followed Mr. Gadsden's presentation of the work of the Electric Railways War Board it was pointed out that local referendum votes do not always give relief in the fare situation even when the request of the railway is backed by the labor unions. It also seemed to be a rather general impression that the public does not believe the statements about the serious condition of the electric railway industry and can be brought to do so only by some radical means.

C. M. Clark, of E. W. Clark & Company, explained the rather drastic plan applied by the Columbus Railway, Light & Power Company in practically doubling the fares to secure the revenue wherewith to meet the increased operating expense. When actually confronted with the situation the Columbus public proved to be reasonable.

Horace Lowry, president Twin City Rapid Transit Company, emphasized that the public does not believe the railways to be in as bad a condition as they claim. The problem is to convince the public of the actual situation.

Thomas N. McCarter, president Public Service Railway, described the fare situation on that property with particular reference to the rehearing of the higher fare case which is to take place before the Public Utilities Commission next Thursday. The company has asked to have the case heard again in the light of the wage awards made by the National War Labor Board. Higher fares are absolutely necessary on this property to preserve its financial integrity.

The basis of a statement made and illustrated by J. D. Mortimer, president North American Company, was that wage increases must be behind applications for fare increases if the latter are to be effective. The urgent thing is somehow to convince the public that it is dependent upon good railway service. Then co-operation will come.

WHAT IS THE RELATION BETWEEN HIGHER FARES AND RIDING?

H. G. Bradlee, vice-president Stone & Webster, outlined briefly the results of the increase in fares to 7 cents in Tacoma, Wash. There has been an apparent increase of about 20 per cent in income, with a 10 per cent falling off in riding. Part of the loss will probably be made up and with the natural increase the riding may soon reach its previous volume.

Richard McCulloch, president United Railways of St. Louis, said that prompt action on the fare increase was

secured in that city on account of the close relation of wages for labor and rate of fare. He thought that it may be necessary to ask for further increase, although a reasonable increase in income resulted from the recent raise.

INTERURBANS MUST NOT BE OVERLOOKED

L. J. Wolf, Aurora, Elgin & Chicago Railway, compared the situation in the interurban field with that in the city field, showing that the two are different. There is a limit to which the interurban rates can be raised, which is determined by competing facilities. The interurban presents its own problems which will require solution in these times. Charles L. Henry, president Indianapolis & Cincinnati Traction Company, emphasized this point by showing that there are many factors which affect interurban revenue besides the matter of fares. The general development of the saving habit by the people in order to permit them to help finance the war is one such factor.

C. L. S. Tingley, vice-president American Railways, brought out the fact that whether or not a raise in fare will produce an increase in income depends in part upon the nature of the territory in which a road operates. For example, where war industries abound, an increase can be expected; otherwise it may not be realized.

P. F. Sullivan, president Bay State Street Railway, pointed out the importance of a general grasp of the present situation. We are dealing with millions now where thousands were dealt with before. Details are important, but most important of all are the fundamental principles involved. Like Mr. Tingley, Mr. Sullivan considers that income is determined now largely by factors other than rates of fare, notably by the losses in revenue due to absence of men from the territory and by the presence or absence of war industries.

THE INVESTORS' POINT OF VIEW

O. B. Willcox, representing the Investment Bankers' Association, said that bankers had hoped that the War Finance Corporation would realize that the electric railways face war problems. War burdens will be borne by our citizens cheerfully if equitably distributed, but at present invested capital is being asked to carry more than its share. The result will be bankruptcy, or a contribution by the public to care for deficits. The latter can be done nationally or locally. Before the war electric railways were about holding their own financially. They should have assistance now because they are essential and because unless relief is given their property will be confiscated. War conditions threaten the integrity of a vast property.

F. W. Frueauff, H. L. Doherty & Company, said that some kind of a subsidy is necessary if railways are to continue, and this idea was reiterated by other speakers, particularly by M. C. Brush, president Boston Elevated Railway. Mr. Brush gave details of the trustee plan under which the Boston Elevated Railway is now operating and showed how the public will pay for the service which it demands. By having representation of all interests on the board of trustees it is possible to get suitable action on any real need of the railway. In Mr. Brush's opinion it is possible to secure local subsidies in some form or other.

In addition to the speakers mentioned above brief remarks were made by the following: P. J. Kealy,

president Kansas City Railways Company; T. W. Wilson, president Wilmington & Philadelphia Traction Company, and Rankin Johnson, president Trenton & Mercer County Traction Company. Numerous questions were put to Mr. Gadsden, who in reply gave many interesting sidelights on the ramifications of the work of the Electric Railway War Board.

ANOTHER CONFERENCE TO BE HELD

Before the meeting adjourned a resolution, moved by Mr. Wolf, was passed to the effect that the meeting, as far as it represented the industry, stand back of the American Electric Railway Association War Board. On Mr. McCarter's motion it was decided that the meeting, when adjourned, should be adjourned subject to further call by the War Board.

NO CONVENTION THIS YEAR

At a meeting of the executive committee of the American Association held in New York, immediately after the conference, it was decided to omit the convention scheduled to be held at Atlantic City early in October. In its place will be a brief meeting in New York on a date still to be determined.

Freight and Express Service Started in Kansas City

THE Kansas City Railways recently instituted express and freight service between the interurban freight station at Kansas City, Mo., and two terminals. One of these terminals is in Independence, Mo., the cars running over the company's tracks, while the other terminal is at Zarah, Kan., 18 miles out over tracks of the Kansas City, Lawrence & Topeka Railway Company.

A motor truck line has been operating between Independence and Kansas City for three years and has a large business. One of the largest department stores has considerable deliveries to Independence, which heretofore have been largely taken care of by its own trucks. The freight cars on the railway tracks now receive this merchandise from the retailer at the interurban station and carry it to the public square at Independence, Mo., where a railway waiting station has been transformed into a receiving station for freight. The bulk of the freight business on both lines from Kansas City outward is from wholesalers, and largely from grocery jobbers. The goods are delivered practically at the doors of the suburban merchant, since their stores are usually located along the electric railway line.

In order to accommodate the citizens along the line, the interurban company is carrying milk cans in its passenger cars until other arrangements can be made. The cars are loaded in the early morning, when there are comparatively few passengers, and thus do not interfere with the passenger traffic.

Despite the agitation for the use of trucks on highways, there has been comparatively little attempt to establish truck service around Kansas City. There are two or three truck lines operating now on rock roads, only one of which serves a community already served by interurbans. The other truck lines are being developed in competition with steam roads.

Study of Car Energy Saving at Dubuque

Tests Made on Level and Hill Lines Show that Savings as High as 26 per Cent Can Be Obtained by Use of Meters as Checking Devices

BY L. E. GOULD

President Economy Electric Devices Company, Chicago, Ill.

A STUDY was conducted last winter on the lines of the Dubuque (Iowa) Electric Company to learn the probable saving in car energy consumption that could be expected from an installation of energy-checking devices on the cars. Referring to the map of the Dubuque lines, Fig. 1, the tests with which this article is concerned were made on the Main Street line and the West Dubuque-Eighth Street line. As the physical conditions of these lines are widely dissimilar, they afford an excellent example of the comparative results obtainable with the same car equipment on level lines and on hills. The tests were conducted by the Economy Electric Devices Company, Chicago, Ill.

The route of the Main Street line, Fig. 1, is parallel with the Mississippi River and its profile is practically level. There are twelve fixed stops and fourteen curves on each round trip, the distance of 5.6 miles being made at an average schedule speed of 8.4 m.p.h. The normal headway is ten minutes with a rush-hour headway of five minutes, but as all other lines in the city use part of the Main Street tracks the average car spacing is less than one minute. The car equipment used was that which is regularly operated on the line. These cars are

steel, low-floor, pay-as-you-enter, double-end, with a seating capacity of forty and a weight of 34,500 lb. The cars are equipped with two GE-203-G, 50-hp. motors geared for a free running speed light of 28.25 m.p.h.; Brill 39-E maximum traction trucks, a GE CP-25 compressor, S. G. 2-valve air brakes, two G.E. K-36-J controllers, and hand-operated doors and steps.

The test cars were each equipped with a 100-amp. capacity Sangamo Economy meter to record the actual energy consumed by the car motors. The test included two periods, the first a blind period, and the second an instruction period. During the blind period the cars were operated with meter dials covered, the meters being read at the carhouse nightly. The data of car mileage and total passengers were obtained from the auditing department. The runs were operated by the regular crews without instructions of any kind. This period lasted three days and from the data obtained the average base figures of energy consumption per car-mile and passengers per car-mile were obtained. A basic figure of 2.093 kw.-hr. per car-mile was thus secured against which to make comparisons. It is quite probable that this figure is slightly lower than the average because of the presence of the meters on the cars, even though



FIG. 1—MAP OF DUBUQUE (IOWA) ELECTRIC COMPANY'S RAILWAY LINES

the dials were masked so that the readings could not be observed by the men.

At the start of the second period the motormen as a group were given a talk on energy-saving methods by A. H. Smith, superintendent. Personal instruction also was given on the cars. Meter record cards of the form here shown were used by the motormen, to set down their energy readings by trips.

RESULTS OF LEVEL LINE TEST

The following tabulation of the test results together with the graphic representation of Fig. 3, will show the comparison between the operating efficiency of the crews during the blind, uninstructed period and afterward when instruction had been given and the meters were being read so that the car energy consumption of each round trip could be reported by the motormen. Due to better handling of the controllers and brakes, the car energy consumption was reduced 0.253 kw.-hr. per car-mile (a saving of 12.1 per cent.) notwithstanding a traffic increase of 1.1 passengers per car-mile (16.7 per cent.). While this saving is not notably large, the type of car used is highly efficient from the energy standpoint, and the transportation department of this road has been consistent in thoroughly training its platform men to maintain efficient power operating methods. Also the basic figure of 2.093 kw.-hr. per car-mile was obtained during a period when the mean average temperature was +23 deg. Fahr. and the saving was made in a period when the

ECONOMY METER CARD			
Line <u>Main St.</u>			
Motorman <u>W. Crahan</u>			
Car No. <u>220</u> Date <u>12/6/17</u>			
Time	Meter Rdg.	Diff.	Remarks
650	1082	7	Peru Rd to Barn Off at Barn
625	1075	11	I.C.
545	1064	12	I.C.
505	1052	10	I.C.
425	1042	10	I.C.
345	1032	8	I.C.
305	1024	11	I.C.
225	1013	12	I.C.
145	1001	12	I.C.
105	0989	8	I.C. Station
1240	0981		Barn to Peru Rd.
SPACES BELOW FOR OFFICE USE			
51.77	101	1.95	
Mileage	KWH	KWH-CM	

FIG. 2—METER RECORD CARD USED IN TEST

average temperature was —1 deg. Fahr. Snow caused slipping of wheels and frozen brakes during both periods and a heavy increase in traffic due to the severely cold weather and the approach of the holiday season filled the cars to capacity. These conditions operated against a maximum saving.

One of the units in the Main Street test was car No. 200. During the blind portion of this test while meter dials were hooded, there was nothing in the power readings obtained from this car to indicate an abnormal condition. However, on the first day of the second period, when meter readings were being taken by the crews, complaints were made relative to difficulty experienced in maintaining schedules without the continuous application of the power, which made saving impossible. The condition of the car continued to become worse, and instead of a decrease in power consumption as made by other cars, it showed an actual increase of 7.01 per cent

during the second period over power requirements during the blind period. It was found that the excessive power required was due to a defect in a side bearing, which was subsequently corrected in the shops. After this the energy consumption of car No. 200 returned to normal.

A separate graph on Fig. 3 shows the erratic action

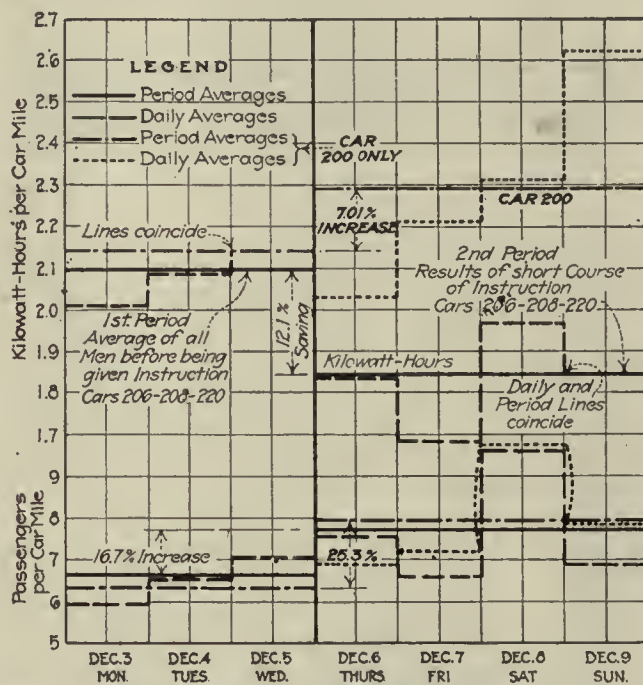


FIG. 3—GRAPH SHOWING RESULTS OF POWER SAVING TEST ON MAIN STREET LINE

of car No. 200. While interfering with the best test results, the action illustrates that in a meter installation: (a) The meter readings will indicate equipment defects; (b) that the car crews are on the alert to report any condition of their cars which prevents them from making satisfactory records. Before the use of meters with instruction, the other crews operating cars in good condition had power readings as high, and in some instances higher, than car No. 200 showing that when no incentive is given for economical use of power,

SUMMARY OF MAIN STREET TEST

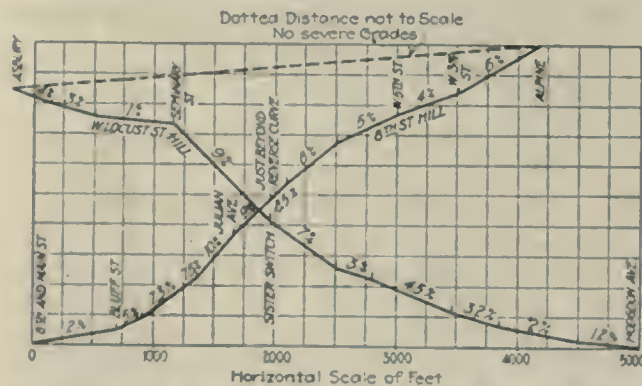
First Period					
Date	Mileage	Kw.-Hr.	Kw.-Hr. per Car Mile	Passengers	Passengers per Car Mile
3	296.04	597	2.01	1760	5.95
4	446.81	935	2.09	2925	6.55
5	446.81	958	2.14	3163	7.08
Totals	1,189.66	2,490		7,848	
Average kilowatt-hours per car-mile for first period				2.093	
Average passengers per car-mile for first period				6.6	
Second Period					
Date	Mileage	Kw.-Hr.	Kw.-Hr. per Car Mile	Passengers	Passengers per Car Mile
6	446.81	821	1.835	3386	7.58
7	296.04	498	1.68	1951	6.59
8	391.81	771	1.965	3762	9.61
9	419.31	770	1.84	2870	6.84
Totals	1,553.97	2,860		11,969	
Average kilowatt-hour per car-mile for second period				1.840	
Average passengers per car-mile for second period				7.7	
Comparisons of Two Periods					
Kilowatt Hour per Car Mile			Passengers per Car Mile		
First Period	2.093		6.6		
Second Period	1.840		7.7		
Difference	0.253		1.1		
Decrease = 0.253 kilowatt-hours per car mile = 12.1%. Increase in passengers per car-mile = 1.1 = 16.7%.					

a much greater amount than necessary will be used. When the crews received instruction which enabled them materially to reduce their power readings on other cars, the condition of car No. 200 prevented such a saving and this fact immediately became noticeable to the operating crew.

TEST ON HILL LINE

The route of the West Dubuque line is between the business district and West Dubuque, located on the river bluffs. This line is largely single track and its steepness is indicated by the fact that it is in competition with a cable-incline railway. There are many safety stops, curves and turnouts on this line, and heavy grades reaching a maximum of 10 per cent as shown in Fig. 4. The round trip mileage is 10.6, the scheduled speed is 7.95 m.p.h., and a normal headway of ten minutes and a rush-hour headway of five minutes are maintained. The same equipment was used for this test as on the Main Street line.

The West Dubuque test included two periods similar to the Main Street test but was conducted with different crews. Weather conditions were about the same until the test was terminated on Dec. 12 by a blizzard





GENERAL VIEW OF REMOTE CONTROL, ONE-MAN-OPERATED QUARRY TRANSPORTATION SYSTEM

Manless Car Operation in a Stone Quarry

A Description of a Third-Rail Remote Control System Which Permits the Operation of All Cars from a Central Tower

THE feasibility of electric motive power for industrial transportation systems has long been recognized by electrical engineers, but owing to a variety of causes it has not received the attention given to other lines of the electrical industry. At present small steam locomotives constitute the bulk of the motive power used on such systems. The present dire necessity for effecting economies along the lines of labor and fuel saving, however, is bringing other methods of car haulage to the front. This article is a brief description of the interesting electrical system used on the quarry railway of the Casarbis Stone Company, Kenneth, Ind. The service requirements in this quarry demand that the transportation system deliver to the crusher from 5000 to 6000 tons of rock per ten-hour day. Also it must readily permit of track shifting and extensions and of accurate car spotting. To fulfill the latter requirement the dump cars must be capable of motion in either direction and the system as a whole must permit of their being stopped, started and operated upon any part of the track.

As installed the equipment consists of twenty motor-driven dump cars, which receive their motive and control energy from a third-rail system, at a central con-



SHOWING THE METHOD OF DUMPING THE MANLESS CAR AT THE CRUSHER HOPPER

trol tower. Except for their motor drive and the modifications in design required to permit the mounting of the motors, there is nothing of special interest in the construction of the dump cars themselves. The third-rail contact system was employed as being best able to meet the requirements relative to track shifting and extension. It is divided into sections, long or short, as the operating conditions may require. Independent feeders connect the sections with the central tower. In this tower are located the controller, illustrated in one of the accompanying photographs, by means of which one man can control the operation of all the cars in the system.

As will be seen from the illustration motor controllers are located in banks at the right and left, while in the center is a bank of distributing switches, one switch being provided for each feeder. This arrangement makes possible the control of the cars on all track sections with a minimum number of motor controllers. These controllers do not make the main circuits directly but, by means of an auxiliary circuit, actuate electromagnetic contactors as in some of the familiar types of electric railway controllers. The motor controllers have three main positions; forward, central or off, and backward. When a lever is pushed forward the rail section, which it is then controlling, is connected through its feeder and a resistor located at the tower to the 250-volt supply. As the lever is pushed farther forward the resistance is cut out. With the lever in the back position the same track section may be energized with from 30 to 100 volts for braking and control purposes.



MANLESS CAR ASCENDING A 6 PER CENT GRADE IN THE STONE QUARRY



SPOTTING A MANLESS CAR IN THE QUARRY READY FOR LOADING



CONTROL EQUIPMENT IN THE OPERATING TOWER

In the installation illustrated, one man operates twenty cars which are served by three steam shovels. Some idea of the saving in labor and cars can be secured from the statement that an equivalent steam locomotive equipment would require about 75 ten-cubic-yard cars, from twelve to sixteen 35-ton locomotives and thirty men.

Special Light Third-Rail Installed Where Clearance for Standard Construction Was Unobtainable

By G. H. McKELWAY

Engineer of Distribution, Brooklyn Rapid Transit System

THE following construction was found necessary on a certain third-rail line in the East in order to carry the third-rail over a short bridge spanning a street. The deck of this bridge was on a level with the top of the running rails which were carried across in grooves in the deck. No provision had been made for the installation of the third-rail at the time the bridge was built and the engineer in charge of the construction would not consider cutting a groove into the deck, as this would seriously damage the water-proofing.

With the usual type of construction employed on this road, the bottom of the third-rail projects a little below the top of the running rail, so that it was impossible to use the standard section of third-rail. A light center-bearing rail, removed from an old surface line, was therefore substituted for the heavy T-rail. This gave

the necessary clearance above the bridge floor, and the smaller cross-section of the center-bearing rail was compensated for by paralleling it with a 500,000-circ. mil jumper. Standard insulators for supporting the rail could not be used on account of the small clearance available, so that the insulators were placed on a "devil strip" between the two third-rails. The caps were placed at right angles to their normal direction so as to support the steel bar, which was so bent as to rest on the caps of both insulators and with the ends under the base of the light third-rail. This steel strap was, of course, alive whenever current was on the third-rail, and to prevent anyone from coming in contact with it a wooden box was made to fit over the insulators and straps, as shown in the accompanying illustration.

Building Up Worn Spring Posts

SPRING posts in the side bearing trucks still in use on some of the cars of the Portland Railway, Light & Power Company wear both in head and shaft to such an extent that it is necessary to replace them from time to time. It has been found that these worn

posts can be very satisfactorily repaired by the use of an electric welder. In fact, when so repaired they are found to be fully as good as new.

The metal deposited by the spot-welding process is "spongy" so as to require hammering or rolling before it will satisfactorily withstand wear. In the case of the spring posts the metal is compacted by being cold



WORN SPRING POSTS REPAIRED BY ELECTRIC WELDER

rolled. The pins are trued up on the lathe to within $\frac{1}{16}$ in. The illustration shows three stages in the process; the worn pin, the pin after being spot-welded, and a completed pin welded, turned and rolled, ready for further service.

This work has been carried out under the direction of F. P. Maize, master mechanic of the Portland Railway, Light & Power Company.

Calculating Machines in Engineering Work

THE construction department of the Connecticut Company, New Haven, is using a Monroe calculating machine for a number of special engineering calculations in addition to routine work, such as adding, subtracting, multiplying, dividing and combining these operations. Among the special tasks to which the machine has been applied are: Preparation of monthly statements of mileage of track, based upon track sketches furnished by the engineer of maintenance of way; annual revision of mileage tables, records of track charges; calculation of route mileage by sections; tabulation of data of all kinds, including annual statements, tax bills, etc. The machine was purchased originally for use in valuation work in which some kind of a calculating machine is a virtual necessity.



SPECIAL SUPPORT FOR LIGHT THIRD-RAIL WHERE IT CROSSES A STREET BRIDGE

Studies in the Wear of Armature Ball Bearings

Results Indicate that Motor Maintenance Is Simplified and Danger of Armature Rubbing on Pole Faces Is Avoided

BY WALTER FINK

Master Mechanic, Austin (Tex.) Street Railway

THE Austin Street Railway operates seven safety cars, the armatures of the GE-258 motors of which are equipped with ball bearings, part Gurney and part S.K.F. These bearings have given no trouble, and require little more attention than squirt-gun lubrication with grease every three months. Service data on the Gurney bearings have not been obtained, the first three cars placed in service here two years ago being equipped with S.K.F. bearings.

So far as ball bearings for armatures are concerned it is obvious that one of their prime advantages is to maintain a constant gap between the armature and the pole pieces, thus preventing the disastrous and costly effect of fast-wearing babbitt bearings. Therefore, we thought it would be interesting to see how long a ball bearing would be sure to protect the user against this kind of service failure, and so made a record of the wear found on the balls and races. The following table shows the results obtained during a period of more than two years:

WEAR OF BALL BEARINGS ON GE-258 MOTORS AFTER APPROXIMATELY 100,000 MILES WORN FROM APRIL, 1916, TO JUNE, 1918

Car No.	Armature No.	Commutator or Pinion-End	Raceway		Balls	
			A*—Wear, In.		B†—Wear, In.	
25	402,856	C. E.	1.370	0.003	0.562	0
		P. E.	1.649	0.014	0.933	0.005
25	402,775	C. E.	1.369	0.001	0.562	0
		P. E.	1.657	0.012	0.936	0.005
26	402,773	C. E.	1.367	0.003	0.562	0
		P. E.	1.658	0.009	0.937	0.001
26	402,772	C. E.	1.368	0.003	0.562	0
		P. E.	1.658	0.008	0.937	0
27	402,768	C. E.	1.367	0.003	0.562	0
		P. E.	1.657	0.012	0.936	0.003
27	402,774	C. E.	1.367	0.003	0.562	0
		P. E.	1.657	0.012	0.936	0.003

* A is the distance in inches from inside of inner race to outside of outer race, bearing assembled.
† B is the diameter of the balls in inches.

In addition to the measurements taken the following conditions were noted: (1) Inner races were all in good condition. (2) Outer races at the commutator end were found to have the outside slightly pitted in some places and faint rings worn from turning in the housing. At the commutator end inside, two small grooves were worn where the balls run. The pinion end outside was slightly pitted in some places and faint rings were worn from turning in the housing and grooves were worn where the balls run. Two ragged holes of 1/8-in. diameter in one of the grooves of armature No. 402,774 appeared to be due to a local defect in the steel. (3) All balls were in excellent condition except one ball of armature No. 402,773, commutator end, which had two pits of about 1/16-in. in diameter. (4) All separators were in good condition. (5) On armature No. 402,856, pinion end, the locking spring on the nut holding ball bearing in place was broken and the nut had unscrewed. Complete mileage data on armature ball bearings are not yet available, but the information given in

the table above might be used as a basis to estimate the life.

The data presented in the table show that the balls of the commutator-end bearing on the six motors tested had not worn at all. The wear of the balls in the pinion end bearing varied from nothing to 0.005 in.

The thickness of the bearing measured from the inside of the inner race to the outside of the outer race, with the bearing assembled represents the amount the armature dropped toward the poles and is one-half the total wear of the bearing. As the table shows, this wear after nearly 100,000 miles of service was found to vary from 0.001 in. to 0.014 in. In the original design the retaining collar which holds the pinion end ball bearing was screwed on and held in place with a locking spring. Breakage of the locking pin spring allowed the collar to unscrew and thus caused the bearing to wear faster. The first remedy was to secure the collar nut with a 1/8-in. cotter key. The second and permanent remedy as applied also by the manufacturer is to discard the nut by shrinking the retaining collar on the shaft.

By referring to the notes under the table it will be seen that the outside of the outer races was found slightly pitted, the scars being rough spots 1/2 in. to 2 in. in diameter. Further study of one bearing on car No. 25 indicated that this was due to the passage of current through the bearings. To prevent this we now ground the motor frame to the truck. In any event, the roughening of the outer surfaces does no harm since the balls do not run on them.

From our experience, we feel justified in saying that the use of armature ball bearings greatly simplifies the upkeep of rolling stock, particularly on small properties where frequent, specialized inspection is out of the question.

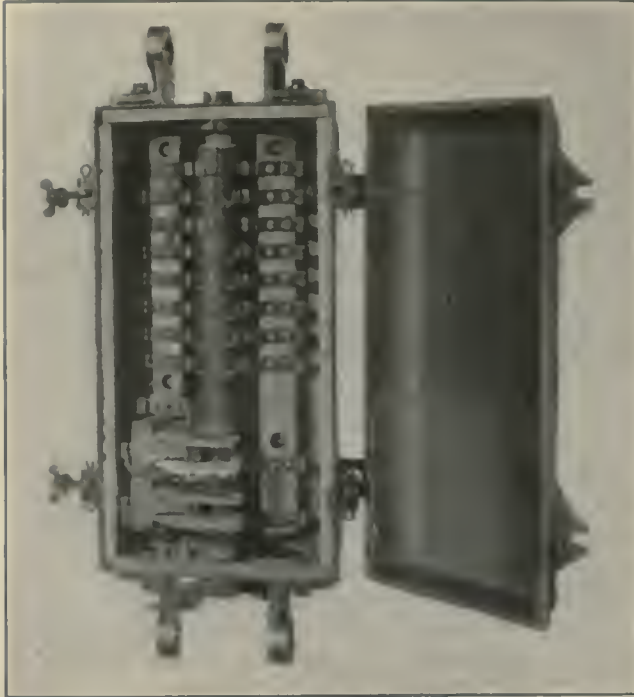
Train Service for War-Time Rush-Hour Traffic

People's Railway, Dayton, Ohio, Is Handling Large Numbers of Munition and Other War Workers
—Details of Couplers Are Given in This Article

The People's Railway, Dayton, Ohio, is having excellent success in using train operation for handling rush-hour traffic. The company, has had the problem of transporting a steadily increasing host of munition workers in addition to the regular rush-hour traffic. The city of Dayton is unique in having its street railway service supplied by six independent operating companies. Of these the People's Railway is one of the oldest and largest, operating some 35 miles of important through routes.

Among the manufacturing establishments located upon its lines may be mentioned the Recording & Computing Machine Company, Ohmer Fare Register Company, Barney & Smith Car Company and the Maxwell Motor Company. All of these have made extensive additions to their plants and operating forces.

To handle this increased traffic the People's Railway has purchased considerable new equipment during the past year and there are now in service forty large double-truck motor cars, fifty-one single-truck motor cars, ten large double-truck trailers (see E. R. J., April 6, 1918, page 669) and fourteen single-truck trailers.



MULTI-POINT DISCONNECTING SWITCH IN ELECTRIC COUPLER CIRCUIT

Special rush-hour service is provided by two and three-car trains consisting of pay-as-you-enter, double-truck, double-end, motor cars with a seating capacity of forty-four, coupled to one or two, double-truck, center-entrance trailers with a seating capacity of fifty-five each. The combined seating arrangement for 154 passengers is no true measure of the total capacity of a three-car train, as large standing room space is provided affording comfortable accommodations for more than 400 passengers. This train service was inaugurated in June, 1917, and has since demonstrated its merits not only in increased transportation efficiency but in the resultant economy as well as the winning of unqualified public approval.

The increased number of loading platforms together with the automatic motorman's signal controlled by the car-door position minimizes the length of stops and

"cleans up" the heavy traffic points effectively. As an extra safety feature long coiled springs, extending between dashes of coupled cars, to provide barriers to prevent pedestrians from walking in between cars. Special vertical metal strips attached to the dashes are used to prevent unsightly chafing of these springs while rounding curves.

For the purpose of saving time in making up trains and insuring safety for trainmen the Tomlinson coupler manufactured by the Ohio Brass Company is used for making mechanical, air and electrical connections between cars. In addition to coupling the cars automatically, this coupler establishes at the same time a connection of the two air-brake pipe lines and the five electrical circuit connections between the cars of the train. The air-pipe couplings are integral parts of the coupler head proper while the electrical couplers are in the form of separable units bolted on the side of the coupler head. Each electric coupler provides contact points for the following purposes: One buzzer signal circuit, two single-stroke bell circuits, one door signal circuit, two spare contact points available for future use, and three circuits connected in parallel for the trolley circuit are used for furnishing heater and light current to the trailers.

An important safety feature of the electric coupler is the multi-point disconnecting switch mounted under the car platform and operated manually by extension handles running to each side of the car near the corner post. These switches are of the inclosed drum type with the air brake cut-out cocks mechanically coupled to the ends of the switch drum in such a manner that air for the brakes on the trailers can be obtained only while these switches are in the closed position. An uncoupled motor car, therefore, cannot be operated with its switches closed (exposed electric coupler contact points alive) due to the fact that the pipes of the air-brake system are open.

An ingenious modification of the standard H. B. life-guard tripping gate permits its ready removal by a forward swing and lifting the engaging hooks from the suspension rod. This is necessary on the coupled end of the motor car to permit lateral swing of the couplers on curves.



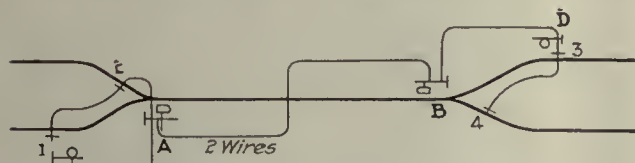
TRAIN WITH CENTER-ENTRANCE TRAILERS, PEOPLES RAILWAY, DAYTON, OHIO

Controlled Permissive Signaling for the Winnipeg Electric Railway

The Number of Cars That May Follow Through a Block in the Same Direction Is Limited by the Revolving Switch of the Signal Relay

IN THE operation of electric railways over single-track sections between successive passing sidings or between double track, it is convenient for several cars going in the same direction to follow through the same block and occupy it at the same time. Single-track permissive signaling is required for such movements. The two signals at the end of the block are interconnected in such a way that when a car has entered the block the signal at the other end of the block indicates "Stop and Stay," while the signal at the entering end indicates "Permissive." In accepting the permissive indication the motorman of a following car is informed thereby that he is entering an occupied block, but that the traffic therein is moving in the same direction. Trolley contactor signals operating in this manner, involving a car counter in the signal relay, have been in use more than fifteen years and have proved of great value.

On street railways having cars running on close headway and free to take a block when the signal is clear or permissive, this very facility of movement is an objection, since by continuous movement in the one direction, at certain spacing, traffic in the opposite direction may be indefinitely held up. To prevent the latter the Nachod Signal Company has developed a "controlled permissive" system in which not more than a predetermined number of cars may follow through the block in the same direction. To accomplish this a peg is set in any desired hole on the revolving switch of the signal relay to control the number of cars that



THREE INDICATIONS CONTROLLED PERMISSIVE SIGNALS FOR WINNIPEG ELECTRIC RAILWAY

may follow through the block; and the system is such that it may be added to Nachod signal installations already in service.

The diagram shows the layout with type CD signals as supplied to the Winnipeg (Manitoba) Electric Railway. The three-indication signals A and B are located near the switch points facing the double track, with entering trolley contactors 1 and 3 two spans in advance of the signals, and leaving contactors 2 and 4 near the frog. Two line wires connect signals A and B, and two line wires connect the contactors at one end of the block with near signal. The arrangement thus far describes the standard permissive signal. The supplementary two-indication light signals C and D are located on the same poles that support the entering contactors 1 and 3, these signals being normally green, but may be thrown to red. In operation, supposing the relay to be set for three cars, then with two cars in the block running from A toward B, signal B will be

at "Stop," signal A at "Permissive," while signals C and D will be green. The third car may therefore enter the block at contactor 1, but this will cause signal C to go to red behind the entering car, and therefore no more cars will attempt to pass under contactor 1. The cars will pass out of the block one at a time, but signal C will remain red until the last car goes out, when it will go to green as signals A and B clear.

Portable Machine Shop Installation Near the Battle Front

PORTABLE machine shops with such equipment as is usually found in a repair shop are used at the front in France. As shown in the illustration the equipment is mounted in cars each 20 ft. long and 5 ft. 4 in. wide. These are used on the light railways (60 cm. gage). The equipment provided includes drilling and grinding machines, hacksaws, lathes and planing machines operated by power from one of the standard



PORTABLE MACHINE SHOPS IN FRANCE

petrol-electric tractors. The equipment is usually installed in groups with the intention of having four or more cars connected up as a unit. The tractors can haul the other cars constituting the machine shop forward or backward as desired. The shop remains in one location, however, unless it is decided to change the light railway base. The sides of the cars are arranged with hinges at the bottom and open outward, thus forming a platform extension on each side.

Where the nature of the repair work is too heavy or complicated to be handled readily in the field, the rolling stock is shifted to a large central repair plant thoroughly equipped with machine tools, spare parts and appliances of various sorts for rehabilitating engines or cars which suffer from the troubles incidental to light railway operation.

Increasing Capacity of Railway Motors by Vanes on Rotors

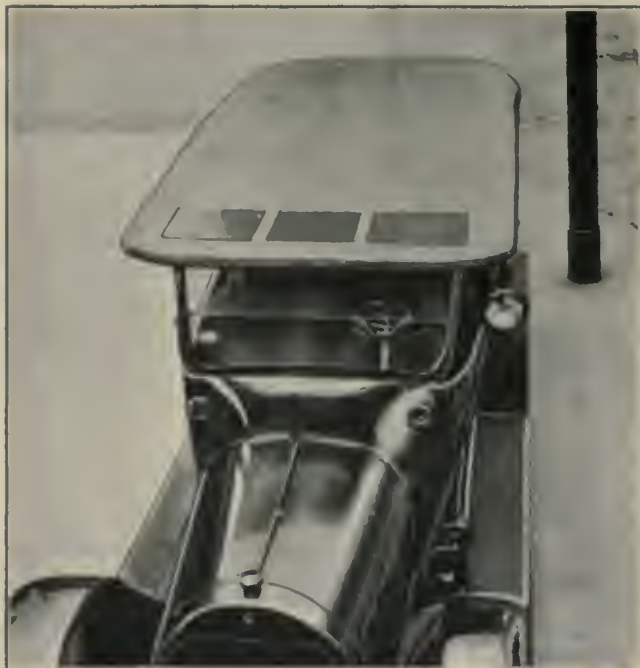
AS DESCRIBED in the ELECTRIC RAILWAY JOURNAL of Aug. 12, 1916, the Portland Railway, Light & Power Company, has been installing vanes for ventilating its GE-58 motors. Up to the present time about 100 motors have been equipped in this way. The plan has been so successful that all the motors of this type are to be so equipped as rapidly as opportunity offers.

The vaned back plates are 14 in. in diameter, and are cast with twelve equally spaced projections $\frac{3}{4}$ in. deep, to which the vanes are riveted with two rivets to each vane. The cost of labor and materials for these new back plates with vanes attached is about \$1.10 each.

Windows in Automobile Top to Facilitate Inspection

BY HAVING openings cut in the top of the automobile which he uses in overhead inspection, James Scott, superintendent of overhead Cleveland Railway, has made this inspection work a great deal easier. As the accompanying illustration shows, a line of three openings about 10 in. x 12 in. each is made in the top immediately over the driver's seat. These openings are covered with celluloid sewed to the material in the top with a reinforcing of several thicknesses of the same canvas as is used in the top. The work was done by the automobile manufacturer.

This simple arrangement permits the inspection of



A HANDY KINK FOR THE INSPECTOR OF OVERHEAD CONSTRUCTION USED IN CLEVELAND

overhead while driving, and incidentally it is very convenient when the driver wishes to make notes at night. In the latter case he can stop his car under a street lamp and have excellent illumination for any notes he wishes to make on a writing pad.

Twenty Cars Remodeled to Safety Type

TWELVE single-truck cars and eight double-truck cars on the El Paso (Tex.) Electric Railway have recently been remodeled for safety car operation through the addition of air brakes and the outfits of the Safety Car Devices Company. In both types resemblance to the new cars in operation has been secured by changing from monitor to arch roof, using the same type of trolley base support and completely refinishing both the interior and the exterior. The cluster lighting has been changed to two individual rows of five 23-watt Mazda lamps each.

The single-truck cars which seated thirty-two passengers now seat thirty-six through the use of extra seats on the idle platform. The seating capacity of the



TWO REMODELED CARS IN SERVICE AT SAN JACINTO PLAZA

double-truck cars has been raised from forty-four to forty-eight. While these cars will not be so fast and so light as those of the Birney type, they will cost appreciably less to operate than before, and will permit more frequent service to be given.

The rebuilt cars are going into operation on the lines first equipped with new cars so that the public will already be accustomed to front-entrance operation. The new cars will be transferred to other lines as fast as they can be replaced by cars of the remodeled type.

Home-Made Gasoline Motor Car for Auxiliary Service

The Sumpter Valley Railway, Baker, Ore., recently built in its shops a gasoline motor car for auxiliary service on its narrow-gage line. A 45-hp. White motor truck engine was used and the body was built to seat twenty-seven passengers. A light four-wheel pilot truck was set under the head end and a single pair of large diameter wheels to which power was transmitted served as the rear truck. The car was designed to make an average speed of 20 m.p.h. and operated over grades up to 4 per cent. Excellent service is reported for the thirty days during which the motor was in use. At the end of that time it was completely demolished in a head-on collision.



GASOLINE MOTOR CAR ON NARROW-GAGE ROAD OF SUMPTER VALLEY RAILWAY

News of the Electric Railways

TRAFFIC AND TRANSPORTATION

FINANCIAL AND CORPORATE • PERSONAL MENTION • CONSTRUCTION NEWS

Improved Co-operative Plan

Company in Philadelphia Announces Further Liberal Modification of Employees' Co-operative Plan

The Stotesbury management of the Philadelphia (Pa.) Rapid Transit Company on Aug. 19 submitted to all employees of the company an improved co-operative plan. It will do more for the men than the plan which has been in such successful operation during the past seven years, and under which the public and the owners of the property have benefited along with the employees.

ALL EMPLOYEES INCLUDED

The co-operative plan as now improved will include benefits to all employees, putting the men in the electrical department, shops and buildings, way, and other departments on a proper comparative basis with those operating the cars. Under the plan, there will be established larger sick and pension benefits and greater life insurance. Wages will be based upon the average of wages established by the War Labor Board in the four big cities, Chicago, Cleveland, Detroit and Buffalo.

Sick benefits will be at the rate of \$1.50 a day commencing with the eighth day's illness, and continuing for a period not to exceed 100 days in any year. This is in addition to the amount which the company pays in case of injury under the Workmen's Compensation Act of Pennsylvania. The present sick benefit is only \$1 a day.

A pension of \$40 a month will be paid to any incapacitated member who has reached sixty-five years of age and been in the service of the company continuously for twenty-five years. This compares with \$20 a month now being paid. Special cases will receive special consideration. Every member will receive a life insurance for \$1,000, maintained while he is in the service of the company. This takes the place of the present death benefits of \$650. For all of these benefits and protection to himself and family, the employee will pay only \$1 a month. The company will contribute \$10,000 a month for the same purpose. Any and every employee who has been with the company a year may become a member of this co-operative plan.

HOW THE PLAN HAS WORKED

Under the co-operative plan which has been in effect some very important accomplishments have resulted. The Stotesbury management took over the property following two serious strikes. The settlement of the last one provided a wage scale of 23 cents in 1911 in-

creasing to 25 cents an hour by July 1914. The co-operative plan was adopted by the Stotesbury management in August, 1911, and accepted by the men in November. It carried a promise that the 22 per cent of passenger receipts would give the car men 28 cents an hour by July, 1916. Actually, they were receiving 31 cents by that time and since then the fund has enabled further increases to 43 cents an hour. In dollars and cents, the result to the men has been that from July 1, 1911, to June 30, 1918, they have received under the co-operative plan \$5,368,153 more than they would have had under the scale fixed in the strike award. Recently, with the approval of the co-operative committee and the management, a further advance of 5 cents an hour was given, making the scale in Philadelphia the same as that established in other cities of the first class by the War Labor Board.

NEW PLAN A FAMILY MATTER

The improved co-operative plan has been sent personally to every employee of the company that he may have it for study at home, and it is requested that the wives of all men shall join with their husbands in making such study, because it is obvious that the plan is essentially a family proposition and it is desired that the women folk indicate, along with the men, their approval of the plan. A card is inclosed with the statement of the plan with places for the signature of both the employee and his wife.

The present plan of representation by co-operative committeemen will be continued with such enlargement as to numbers as the added membership of the improved co-operative plan makes necessary.

Increase in Wages for Third Avenue Men

The Third Avenue Railway, New York, N. Y., on Aug. 21 announced an increased scale of wages for its motormen, conductors, and storage battery men. The increase affects a total of 2100 employees, on all the lines operated by the company in Manhattan, the Bronx and Westchester.

By the increase the scale of from 30 to 36 cents an hour which has been in force for all classes of employees is raised to a scale of from 40 to 43 cents. First, second, and third-year motormen and conductors will receive 40 cents, and men of more than three years' service will be paid 43 cents an hour. Storage battery men, regardless of the term of service, will receive a flat rate of 40 cents an hour.

Hearing on Cincinnati Grant

Salaries and Fares Principal Points Discussed at First Public Hearing on New Grant

At the first public hearing on the proposed revision of the street railway franchise at Cincinnati, Ohio, Councilman A. L. Murdock demanded that the Cincinnati Traction Company be required to submit a statement showing the salaries paid its officers. C. W. Culkins, director of street railways, explained that he has no authority under the present franchise to require the company to make such a statement, but he said that figures had been submitted showing that the amount of salaries paid the officers and legal representatives averaged \$6,000 a month, which is less than 0.08 cent per car passenger and has little bearing on the fare question.

CITIZENS WANT FIVE-CENT FARE

W. J. Schultz, representing the citizens' committee, asked that the rate of fare in the revised ordinance be changed from 6 cents to 5 cents. He declared that if the change was not made, there would not only be a referendum, but an ordinance would be initiated which would take away from the City Council the power to regulate fares. He made a long talk in explanation of the relations existing between the Cincinnati Traction Company, the Cincinnati Street Railway and the Ohio Traction Company.

The ordinance was read for the second time before the City Council on Aug. 16. It is possible that it will be brought up for a third reading and passage on Aug. 21 or 22. Mayor Galvin has assured officers of the Amalgamated Association that he will sign the ordinance as soon as it is passed. Employees have notified the company that some action on an increase in wages must be taken by Aug. 30.

COUNCIL MEMBERS FAVOR MEASURE

Several other public meetings have been held, but there are indications that a majority of the members of Council favor the measure and will vote for it, in the belief that it is the best arrangement that can be made under present circumstances.

Another hearing was held on Aug. 19. Many suggestions were made, but few were adopted.

The report of the sub-committee on the revision of the franchise was approved by the joint Council and citizens' advisory committee on Aug. 9. The main provisions of the revised draft were reviewed in the *ELECTRIC RAILWAY JOURNAL* of Aug. 17, page 302.

Service-at-Cost for Chicago

Salient Features of New Plan Now Awaiting Public Approval and Passage of Enabling Acts for Unification

A "service-at-cost" plan has again been applied in the solution of a long transportation controversy. The Chicago City Council on Aug. 14, as mentioned in a preliminary note in the *ELECTRIC RAILWAY JOURNAL* of Aug. 17, sanctioned an ordinance to bring about the consolidation of the surface and elevated systems and to provide for the construction of subways by the city. The personnel of a board of trustees named by the companies was approved by the Aldermen and, if the measure finally becomes effective, these nine men will have full charge of the corporation and the carrying out of a construction program involving \$500,000,000.

MEASURE MUST GO BEFORE VOTERS

Various steps are still to be taken before the ordinance becomes law, but the overwhelming vote in Council is said to indicate that the measure meets with popular approval. If the franchise is not vetoed by the Mayor, it will be submitted to the voters of the city on a referendum on Nov. 5 next. If it is approved by the public, the State Legislature next January will be asked for new laws, giving the trustees the right to operate the combined system, permitting franchises longer than twenty years, and amending the subway act so as to permit the city to lease bores for longer than twenty-year periods. All these acts must again be submitted to the City Council. Then the various companies will be allowed six months time in which to perfect a consolidation and accept the ordinance. It is believed that the ordinance will become effective about January, 1920.

To review briefly the main points of the ordinance, noted heretofore in this journal, it may be stated that the new ordinance gives the Chicago Local Transportation Company—the new trustee corporation—authority to take over the existing properties without paying a dollar and to construct, maintain and operate the combined system, including subways for surface and rapid transit lines to be paid for out of the city's traction fund. The plan contemplates operation of service at cost with full protection of the capital investment during an indeterminate period.

CONTROL BY TRUSTEES

Management of the corporation is to be vested in a board of nine trustees, the members of which up to 1928 are to be named by the present companies subject to approval by the City Council. Three of the members are to hold office until Dec. 31, 1928, three others for another year, and the remaining three until Dec. 31, 1930. The City Council is to designate their successors, and any vacancies are to be filled by the board. The annual salary is to be \$5,000. Three of the nine trustees are

to compose the executive committee and receive extra compensation. The board will have power to elect officers of the company, who may or may not be trustees.

The financial plan is somewhat complicated. The authorized capital account as of June 30, 1916, is \$220,114,428, and of this amount 60 per cent is to be in the form of bonds and the remaining 40 per cent will be stock or debentures. The bonds are entitled to receive present rates of interest. The other securities are to be guaranteed a return of 8 per cent up to 1932, the end of the average franchise life, and 7 per cent thereafter. All new capital will receive a return based on actual cost. Some of the corporations have bonds outstanding in excess of the purchase price and all have more than 60 per cent of their obligations in the form of bonds. These excess securities will have to be exchanged for debentures with no lien on the property but with a higher rate of return.

There is sufficient money in the present city traction fund to build the subways called for under the ordinance. These subways will be rented to the company at 6 per cent after operation begins, while the charge for city money during construction will be 3 per cent.

For maintenance and repairs the company must spend each year 6 per cent of its gross receipts, and the unexpended portion is to be deposited in a special fund. The renewal and depreciation fund will be made up from payments of 8 per cent of the gross receipts every month, and the trustees may increase this percentage when necessary.

ACCOUNTING SYSTEM

Commencing five years after the effective date of the ordinance, one-fourth of 1 per cent of the then outstanding capital account is to be paid into an amortization fund from the receipts of the combined system. Each five years thereafter this amount is to be increased until it reaches 1 per cent of the capital account, with the provision that the amount paid in any year is never to be less than in the preceding year. This fund is to be used either for betterments and extensions other than subways or the retirement of outstanding securities.

The accounting system calls for the payment of: (1) all operating expenses; (2) interest on bonds; (3) subway rentals; (4) payments into the amortization fund, and (5) payment of interest due on other securities. If the gross receipts are insufficient in any year to meet these payments, the deficit is to be cumulative. Any surplus is to be deemed surplus receipts and be added to the amortization fund.

Rates of fare are to start with 5 cents for each passenger twelve years of age or over, and 3 cents for each

passenger between seven and twelve years. If, however, any other rate is in force when the ordinance becomes effective, that rate is to continue until altered by the trustees. The latter also have authority to fix a charge of 2 cents for transfers between rapid transit and surface lines. An emergency fund of \$2,000,000 is created to protect the required payments and, if this is diminished below \$1,000,000, the trustees are obligated to put into effect immediately higher transfer charges or rates of fare until the deficit is made up. Moreover, if the surplus receipts at any time are sufficient to justify a reduction in the transfer charge or rates of fare, the trustees are required to make such reduction. The transfer privileges are extremely liberal under the ordinance, as each passenger is to be allowed to transfer wherever two lines connect, intersect or come within 200 ft. of each other.

CITY HAS RIGHT OF PURCHASE

The company is permitted to carry express matter and package freight on terms to be approved by the trustees, and it may enter into contracts with connecting roads for through freight business. The company is required to pave, repave and keep in repair the part of the streets occupied by its tracks. There is also a provision that the company clean and sprinkle its right-of-way, but whenever a deficit is created which would require an increase in fares or transfer charges the company may be relieved of these latter obligations until the deficit is made up.

The right is reserved to the city to purchase the property of the company at any time, on giving six months' notice, by paying the then existing capital account. This price as of June 30, 1916, was \$220,114,428 for the combined properties, the elevated valuation being \$70,943,020 of this amount.

There is also a section in the ordinance covering labor, which provides that hours of work and working conditions shall conform to reasonable standards, and that the employees shall receive wages not less than those customarily paid for similar work elsewhere.

PROGRAM OF PHYSICAL CONSTRUCTION

The ordinance also includes all details as to the program for physical construction. The various elevated extensions and improvements, as well as the subway routes, are listed, a considerable proportion of the work being placed in the first and second three-year periods. Detailed provisions are also set forth for permits, spacing of tracks, special work, poles and wires, pavement, power houses, cars, etc.

There is no change in the present electrolysis ordinance, except that a board of electrolysis claims is established consisting of three members, one to be named by the city, one by the company. In the event that they are unable to agree on the third member, the latter is to be appointed by the Western Society of Engineers.

Seattle Wage Contract Signed

The proposed new contract between the Puget Sound Traction, Light & Power Company, Seattle, Wash., and its trainmen has been signed and ratified by both parties, effective as of Aug. 1. The contract provides for an eight-hour day, arbitration of all differences between company and employees, time and a half for overtime, and co-operation in the arrangement of schedules to make as many straight runs as possible. A similar agreement has been drawn up to be signed by the city and the employees of the Municipal Railway.

The contract provides that the company shall not discriminate against union men, and on the other hand, that the union shall not discriminate against such employees as do not desire to join the organization.

The agreement is to continue in force until Aug. 1, 1919, and from year to year thereafter unless either party desires a change, when notice of such desire must be given in writing thirty days before Aug. 1 of each year.

The union of railway employees has asked the city to hasten the examination of the company's books, in order that a settlement may be reached on the question of relief for the company, so that the wage scale may be put into effect. The scale will be retroactive as of Aug. 1, and if no adjustment can be reached by the city and the company, the entire matter will shortly be referred to the National War Labor Board.

The new wage scale increases the present wage of 33 to 40 cents an hour to 50, 55 and 60 cents an hour. Other conditions will remain practically the same as under the old agreement.

Generator Accident at Norfolk

An accident on July 26 to the 12,000-kw. steam turbine at the Reeves Avenue power house of the Virginia Railway & Power Company, Norfolk, Va., has more or less seriously interfered with street railway service at Norfolk and vicinity. The company has been able to operate about 60 per cent of the normal regular service with the exception of two days during the week ended Aug. 10, when the commercial power load and the intense heat resulted in heating the generators to a point where it was deemed advisable to discontinue the operation of the cars in order to avoid further dynamo trouble. Service was abandoned for the two days referred to from 8 a. m. to 5.30 p. m. and from 7.30 p. m. until midnight. The service that was given enabled the company to assist in taking care of the morning and evening rush.

The president of the Board of Control of War Construction Activities for the locality at Norfolk looked into the situation with a view to cutting off temporarily such commercial power as in his opinion was not absolutely essential. This reduction of power load

has enabled the company to resume the operation of approximately 60 per cent of the regular service throughout the day on the lines in the city.

Portland Would Run Line

To guide the city in its proposal to establish a municipal railway to Linnton for the relief of industries in that district along the line of the old United Railways, Mayor Baker of Portland, Ore., has asked the city legal department to furnish an opinion setting forth the legal questions involved, and outlining a complete method of procedure to be followed.

The United Railways has presented an inventory to the city giving a valuation of \$232,000 on the line as railroad property, this price not including equipment. City Traffic Examiner E. M. Cousin presented an inventory of the same line, giving a valuation of \$90,000 less. It is estimated that it would cost the city approximately \$150,000 to place the road in operation, this price including cost of constructing 3 miles of tracks which have been torn up. Examiner Cousin states that cars can be bought for \$8,000 each, and that it will cost the city about \$25 a day for power and \$40 a day for labor, figuring on thirty trains daily.

Judge C. H. Carey, representing the United Railway, has advised the Council that his company would not operate the line to Linnton, nor would it reconstruct the line, but that the company was willing to co-operate in any other way with the city in serving the people of Linnton with electric railway facilities.

Commissioner Kellaher proposes to issue public utility certificates bearing 4 per cent interest, and Mayor Baker advises that if the people of Linnton are willing to buy these certificates, he will favor the issuance of them. It has been virtually agreed that if the city is able to reach an agreement with the company as to price, and definite assurance is given that the Linnton people will care for the certificates, the city will purchase the line and begin operation.

Providence Wage Decision Later

A decision in the case involving the demand of the employees of the Rhode Island Company, Providence, R. I., for an increase in wages, will be delayed by the joint chairmen of the War Labor Board, probably for a month or even longer.

The question of wages for the men in Providence was one of the last to go before the board. The federal trustees in charge of the Providence property under the New Haven dissolution decree refused the demand of the union. Later an agreement was reached to put the matter before the federal board, but only on the understanding that the status of the company, financial and otherwise, would be taken into consideration.

Short Strike in Ottawa

The strike of the union employees of the Ottawa (Ont.) Electric Railway has been settled. After a tie-up, which practically paralyzed business in Ottawa for two days, the railway resumed operation on Aug. 15 on all the various lines.

The decision to return to work was reached at a meeting of the conductors, motormen and other employees held in the union headquarters at which they passed upon the proposal made by Senator Gideon Robertson to submit an appeal from the award of the conciliation board. The conciliation board awarded the men 33, 35 and 37 cents an hour. The previous wages had been 26, 28 and 30 cents. The men asked for 46 cents for men in the service six months, 48 cents for men in the service twelve months and 50 cents for men above one year's service.

The strike ended without the slightest sign of violence. Police and soldiers were on duty, but the action of the company in deferring the operation of its cars precluded all possible difficulty.

Labor Board Approves P. R. T. Wages

The National War Labor Board has approved the action of the Philadelphia (Pa.) Rapid Transit Company in voluntarily increasing the wages of its employees and otherwise revising conditions of employment to correspond with the award recently rendered in electric railway controversies by William H. Taft and Frank P. Walsh, joint chairmen of the board.

The company increased the wages of its 7000 employees to correspond with the scale applied by Messrs. Taft and Walsh in other first-class cities of the country. Moreover, it agreed that its employees may belong to any union which they may see fit to join, and offered to reinstate all of the men who participated in the strike, beginning May 29 last, without prejudice, and at the same rate of pay as they would have received had they continued uninterruptedly with the company.

As a result of the company's action, the board dismissed the complaint entered by the Street & Electric Railway Employees' Protective Union. This complaint originated following the strike. It was renewed following the company's adoption of the Taft-Walsh award, on the ground that union workers were still being discriminated against. While dismissing the complaint, the board directed the secretary to assign an examiner to supervise enforcement of the award in Philadelphia as is being done in other cities. The motion adopted by the board follows:

"That inasmuch as the Philadelphia Rapid Transit Company has accepted the award of the National War Labor Board as applied to other cities of like class, the complaint of the Street & Electric Railway Employees' Protective

Union is dismissed, and that the secretary be instructed to appoint an examiner to see that the award is enforced as in other cities."

The new scale of wages for Philadelphia was announced in detail in the *ELECTRIC RAILWAY JOURNAL* of Aug. 10, page 251.

Vienna Walks

Now and then the stories that are published in regard to the economic conditions within the Central Powers contain references to the matter of city railway transportation. They indicate without exception a very serious condition with respect to service, equipment and personnel. One of the latest of these sporadic articles sent from Zurich, Switzerland, indicates that the local railway situation in Vienna has reached such an acute stage that there is a prospect of total suspension of service during the coming winter. So serious are conditions that the Burgo-master had a recent audience with Emperor Charles, in which he begged him to intercede with the military authorities, from whom must come all materials for repairs and also necessary lubricants. On the other hand Budapest is said to obtain from the military authorities everything it needs for the same purpose.

Since the war the Vienna lines have assumed a service never before contemplated. They carry freight, food-stuffs, wounded, and at night perform the service of funeral cars from the war hospitals to cemeteries. It is estimated that they have transported 1,000,000 wounded. All this has been achieved although about 11,000 employees of the lines have been called to the colors.

Municipal Railway Extension Plan

The City Council of Seattle, Wash., recently passed an ordinance introduced by Councilman Oliver T. Erickson providing for the issuance of \$1,200,000 of utility bonds for the construction of an extension of the municipal railway from the city limits north of Green Lake to connect with the elevated line and thence to the Lake Burien line, which runs beyond the southern city limits.

The plan contemplates the construction of the line from East Eighty-fifth Avenue to Tenth Avenue northeast, south on the latter street, across the Tenth Avenue's northeast bridge, now under construction, to Fuhrman Avenue, thence to Fairview Avenue, to Virginia Street and Fourth Avenue, and thence south over the tracks of the Seattle & Rainier Valley Railway to First Avenue South and Washington Street, where the extended line will connect with the elevated railway.

It may be necessary to construct a bridge along the east side of Lake Union, where the line will skirt the shore, as the Fairhaven Avenue bridge is not wide nor strong enough to carry cars.

News Notes

Capital Traction Men Want Increases.

—An increase to a maximum of 48 cents an hour for motormen and conductors has been asked by men of Capital Traction Company, Washington, D. C.

Wage Increase for Indiana Union Traction.—An increase of 4 cents an hour has been given 400 conductors and motormen of the Union Traction Company, Indianapolis, Ind. The wage schedule, which was from 26 cents to 36 cents an hour, will be increased to 30 cents to 40 cents an hour. The increase went into effect on Aug. 15.

Northern Indiana Increases Wages.—The Northern Indiana Railway, South Bend, Ind., has increased wages on both interurban and city lines. The interurban scale, formerly from 26 cents to 35 cents an hour, has been increased to 33 cents to 40 cents an hour. The city scale, now from 25 cents to 30 cents an hour has been increased to 28 cents to 33 cents an hour.

Seattle Report Completed.—Thomas F. Murphine, superintendent of public utilities of Seattle, Wash., has completed his examination into the books and accounts of the Puget Sound Traction, Light & Power Company, undertaken to determine whether increased fares will be necessary to meet the increase in wages granted trainmen on Aug. 1. The report will be turned over to the City Council in the near future.

Strike in St. John.—Members of the street railway and allied unions at St. John, N. B., struck on Aug. 15 and the city is without railway service. A shut-down of the entire plant of the New Brunswick Power Company, which controls the St. John Railway and supplies industrial plants and house electric lighting, is threatened. The gas service has been cut off and newspapers are being set by hand. The men struck on a question of back pay.

Strike at Marion Settled.—On Aug. 16 the striking motormen and conductors on the local line of the Columbus, Delaware & Marion Electric Company at Marion, Ohio, and the management of the road reached an agreement without any outside aid. During the period of the war the men are to receive from 33 to 38 cents an hour and the scale will be advanced annually 1 cent an hour for six years of service. The increase amounts to about \$7,000 a year to the company.

Separate Louisville Organizations.—Employees of the Louisville (Ky.) Railway who have declined to join the newly organized union recently held a meeting at the offices of the company

and formed an independent organization, with the name of Louisville Street Railway Employees' Association. The new association is composed of the older employees, who declare their loyalty to the company and their intention not to demand an exorbitant increase in wages.

Arbitrator Protested.—The appointment of C. U. McElroy, Bowling Green, Ky., by Governor Stanley as the third arbitrator at Lexington, Ky., has been protested by the union and Secretary of Labor William B. Wilson has notified Eugene Southerland, president of the union, that he will send a representative to Lexington. The Kentucky Traction & Terminal Company had selected F. W. Bacon, Philadelphia, as its representative and the union had B. F. Kible, Portsmouth, Ohio. These two were not able to reach an agreement and the Governor was asked to appoint a third man.

Toledo Commission Files \$9,500 Expense Account.—A report of the moneys received and expended during its investigation of the street railway nuddle and the preparation of the so-called community plan, was filed with Mayor Cornell Schreiber of Toledo, Ohio, on Aug. 16 by the Toledo Street Railway Commission. In all John N. Willys furnished \$9,500, all of which was expended in one way and another. Provision was made in the ordinance reported for the repayment of this money to Mr. Willys. Of this, it seems, Johnson Thurston received \$2,600 for legal and general services. He was one of the members of the commission.

Employees Organize for Mutual Aid.—The Eastern Texas Electric Company Employees' Association of Beaumont, Tex., has been organized and charter has been filed in the office of the Secretary of State at Austin. This association has no capital stock and is for the mutual help and protection of the employees of the electric company, which recently consolidated the Stone & Webster properties of Port Arthur and Beaumont. The association will operate along lines similar to the employees' association recently organized in Galveston by the employees of the Galveston Electric Company and the Galveston-Houston Interurban line.

Wages and Fares Coupled.—With the announcement on Aug. 15 by officials of the Wilmington & Philadelphia Traction Company, Wilmington, Del., of an increase in wages of 4 to 5 cents to motormen and conductors, based on length of service, the company intimated that a further increase in fares might be asked. The new wage increase is in accordance with the recommendations of the War Labor Board. The employees have been receiving from 37 cents to 40 cents an hour. The company some time ago increased fares to 6 cents and it is expected that it will petition the Public Utilities Commission for the right to charge 7 cents a ride, or sell four tickets for a quarter. The new wage scale went into effect as of Aug. 15.

Financial and Corporate

Havana Lines Gained

Higher Costs, However, Reduced the Gain of 16 per Cent in Gross to 1.5 per Cent in Net

For the year ended Dec. 31, 1917, the earnings from operation of the Havana Electric Railway, Light & Power Company, Havana, Cuba, showed substantial gains as compared to those for 1916. The gross earnings from operation were 16.16 per cent greater than in 1916 and, although the extraordinary rise in the prices of all commodities increased the operating expenses 33.8 per cent, the net earnings from operation gained 5.24 per cent. Even after the deduction of both the United States and Cuban taxes, there still remained 1.57 per cent more than in the preceding year. Detailed figures for the last two years are given in Table I. The division of 1917 earnings is shown in Table II.

The total number of passengers in 1917 was 66,418,450, an increase of 6,719,659 or 11.25 per cent. This is the highest percentage increase since 1906, when the present management began. Passenger earnings also gained 11.25 per cent. Track statistics show 2.21 miles of main line built during 1917.

The increase in operating expenses in the railway department, caused by the unusual conditions during the year, was lower in proportion than in the gas and electric light and power departments. In the former case about 31 per cent of the increase was due to coal, 42 per cent to rise in wages of motormen and conductors, 14 per cent to loss from the book values of discarded power plant equipment sold, and 13 per cent to salaries, wages, supplies and miscellaneous charges.

Comparative statistics for the railway department in 1916 and 1917 are shown in Table III.

Out of the net income for 1917, or \$2,615,261, the company set aside as reserve for depreciation and special charges the sum of \$211,843. It also paid out \$1,976,254 in 6 per cent preferred and common dividends, and provided \$117,373 for sinking funds and

TABLE I—COMPARATIVE INCOME STATEMENT OF HAVANA ELECTRIC RAILWAY, LIGHT & POWER COMPANY FOR CALENDAR YEARS 1916 AND 1917

	1917 Amount	Per Cent	1916 Amount	Per Cent
Gross earnings.....	\$6,989,599	100.0	\$6,017,708	100.0
Operating expenses & taxes	3,385,470	48.4	2,443,885	40.6
Net earnings.....	\$3,604,129	51.6	\$3,573,823	59.4
Other income.....	149,755	2.1	144,561	2.4
Gross income	\$3,753,884	53.7	\$3,718,384	61.8
Fixed charges.....	1,138,623	16.3	1,297,093	21.6
Net income..	\$2,615,261	37.4	\$2,421,291	40.2

\$64,000 for bad and doubtful debts. The balance then carried forward to 1918 totaled \$2,270,290.

Dividend Complaint Dismissed

After a brief investigation of the complaint filed with the District Attorney in which it was charged that officers and directors of the International Railway, Buffalo, N. Y., violated the law last March by declaring a dividend when there was a deficit in the treasury, the District Attorney dismissed the complaint, holding there was no basis for such a charge. An investigation of the company's books showed there was a surplus at the time the dividend was declared. No inquiry has ever been made regarding the assertion that the company filed false statements with the commission.

Boston Gross Gains

First Two Weeks with 7-Cent Fare Show Gain of 30 per Cent in Gross

The recent fare increase from 5 cents to 7 cents on the Boston (Mass.) Elevated Railway affords one of the first opportunities for the industry to study the effect of a substantial rate advance upon the earnings of a great city property. In the Boston case the advance was simply a straight 2-cent additional collection on all fares. The free transfer arrangements are not involved in the matter from the financial standpoint. If the number of revenue passengers carried on the road had remained the same after the increase as before it, there would have been a gain of exactly 40 per cent in earnings of the company.

The actual gain in gross, however, as indicated by the first two weeks under the new schedule of fares, has been 30 per cent. This is a remarkable increase, in comparison with the experience of other electric railways in the State. In many other cases where the fare has been raised from 5 to 6 cents or from 6 to 7 cents, the gain in revenue has been barely half or even less than half the theoretical percentage increase; and sometimes, where the rates are complicated through the use of tickets or the modification of zone limits, the gain has been almost negligible.

The Boston Elevated Railway operates in about a dozen cities and towns, which border on the city proper or are immediately adjacent suburbs. There is a competitive suburban steam railroad service in the Boston district which does a large business; jitneys are not at present a real factor in the situation, but the private automobile is a decided "revenue cutter." Long observation of traffic conditions indicates that the greater part of the falling off in revenue resulting from the advance from 5 cents to 7 cents is to be attributed to a curtailment of trips not associated with travel between home and office or shop, and including short-haul travel which would not hesitate at a 5-cent fare but which holds off at 7 cents. The bulk of the daily necessary patronage is continuing, and so far the increased fare is not sufficient to divert any very substantial traffic to the competing steam railroad lines.

The 30 per cent increase in revenue above obtained will, however, have to be further augmented in order to enable the company to meet its increased operating expenses, fixed charges and its specified dividends, according to present indications. It cannot be said at this time whether a further increase in the fare unit will be required, or whether some zone plan will have to be tried, at least with respect to the outer lines. Back of whatever plans for increasing revenue may be adopted stands the tax power of the State as an ultimate guarantee of the actual cost of the service of the company as a public necessity.

TABLE II—SUMMARY OF OPERATIONS BY DEPARTMENTS OF HAVANA ELECTRIC RAILWAY, LIGHT & POWER COMPANY IN CALENDAR YEAR 1917

Department	Gross Earnings from Operation	Operating Expenses and Taxes	Per Cent of Gross Earnings	Net Earnings from Operation	Per Cent of Gross Earnings
Electric railway.....	\$3,499,011	\$1,782,845	50.95	\$1,716,166	49.05
Electric light.....	2,454,312	790,413	32.20	1,663,898	67.80
Gas.....	817,295	562,203	68.78	255,092	31.22
Stage lines.....	173,968	206,804	118.87	*32,835	*18.87
Electric omnibuses.....	22,523	26,625	118.21	*4,102	*18.21
Gasoline omnibuses.....	22,488	16,577	73.71	5,910	26.29
	\$6,989,599	\$3,385,469	48.43	\$3,604,129	51.57

TABLE III—COMPARATIVE RAILWAY STATISTICS FOR 1916 AND 1917

	1916	1917	Increase	Per Cent
Total number of passengers carried....	59,698,791	66,418,450	6,719,659	11.25
Passenger car-miles.....	12,143,682	13,387,023	1,243,340	10.24
Passenger earnings.....	\$2,984,939	\$3,320,922	\$335,982	11.25
Passenger earnings per car-mile.....	\$0.2481	\$0.2481	\$0.0023	0.93
Total earnings from operation.....	\$3,122,362	\$3,499,011	\$376,648	12.06
Total operating expenses.....	\$1,307,928	\$1,663,917	\$355,988	27.22
Total operating expenses per car-mile.....	\$0.1076	\$0.1243	\$0.0167	15.52
Operating ratio (per cent).....	41.89	47.55	5.66	13.51
Net earnings from operation.....	\$1,814,434	\$1,835,093	\$20,659	1.14

*Decrease.

W F. C. Helps Aurora Line

A. E. & C. R. R. Will Have New Note Issue of \$1,219,000, with Direct Federal Aid of \$219,000

As a result of conferences and negotiations with the War Finance Corporation, the Aurora, Elgin & Chicago Railroad, Wheaton, Ill., will create a new issue of \$1,219,000 of three-year 7½ per cent collateral trust notes, dated Sept. 1, 1918, and secured by the company's first and refunding mortgage bonds at 75. All legal matters pertaining to the issue are to be subject to approval of the counsel of the War Finance Corporation.

Of the required amount, the War Finance Corporation will make a direct advance of \$219,000, subject to certain conditions, among which are:

1. That the maturity of the outstand-

shown in the accompanying table, was more than offset by the rise of \$1,267,082 in operating expenses, so that the net earnings decreased \$139,963 or 1.9 per cent. The balance available for renewals, financing and dividends showed a falling off of \$402,056 or 13.6 per cent.

The increase in operating costs arose from the higher expenditures for coal, oil and wages. These were as follows: Coal and oil, \$342,000, and labor, \$292,000. Taxes increased \$189,000.

During 1917 the sum of \$3,950,822 was expended for additions, betterments and extensions in railway, gas, electric, steam and water departments. During the year there was expended or appropriated from earnings for repairs, maintenance and renewals and replacements \$2,156,115, which was \$104,945 in excess of the appropria-

and Porto Rico. The personnel of the regional committees and the state chairmen were published in the ELECTRIC RAILWAY JOURNAL of March 30.

The Investment Bankers' Association of America has offered to join forces with the members of the regional and state committees in presenting the problems of the industry to state and municipal authorities and will assist in any other way that is justified by local conditions. In some states the investment bankers have already organized committees and the National Public Utilities Committee has recommended a whole-hearted acceptance of the offer of the Investment Bankers' Association.

To convince Washington officials that the public utilities have made the greatest possible effort to secure relief from the local authorities, the regional and state committees will ascertain and report to the National Public Utilities Committee what companies are in need of relief, what action has been taken toward securing it, and what the results have been. This information will be presented to the various bureaus, boards, committees and administrations having an interest in the public utility problem. It is the purpose in the future to give complete facts in every case and to avoid generalizations.

COMPARATIVE INCOME STATEMENT OF SUBSIDIARIES OF UNITED GAS & ELECTRIC CORPORATION FOR CALENDAR YEARS 1916 AND 1917

	1917	1916	Increase	Per Cent
Gross earnings	\$16,287,275	\$15,160,156	\$1,127,119	7.4
Operating expenses (including maintenance)	8,998,329	7,731,247	1,267,082	16.4
Net earnings	\$7,288,946	\$7,428,909	*\$139,963	*1.9
Taxes	1,156,370	967,100	189,270	19.5
Gross income	\$6,132,576	\$6,461,809	*\$329,233	*5.0
Fixed charges	3,575,989	3,503,166	72,823	2.1
Net income available for renewals, financing and dividends	\$2,556,587	\$2,958,643	*\$402,056	*13.6

* Decrease

ing \$1,546,000 of bonds of the Elgin, Aurora & Southern Traction Company be extended to Sept. 1, 1921.

2. That the banks holding the company's unfunded notes—\$237,000 in amount—subscribe for \$200,000 of the new 7½ per cent collateral trust notes at par and accept the company's unsecured notes for the balance.

3. That the holders of the company's \$800,000 of 6 per cent collateral trust notes, maturing Sept. 1, 1918, exchange their notes, par for par, for the new 7½ per cent collateral trust notes.

The company performs vital functions in the transportation, power and lighting fields in the district immediately west of Chicago. The present abnormal costs of labor, fuel and materials have brought about a condition resulting in a material curtailment of its net earnings and thus made it unable to secure funds through regular banking channels.

It is believed that a timely realization of the abnormal conditions confronting the public utility industry as a whole will influence holders of the company's maturing notes and bonds to extend them to Sept. 1, 1921, and thus enable the company to accept the offer of the War Finance Corporation.

U. G. & E. Subsidiaries Show Lower Net

The gross earnings of the subsidiaries of the United Gas & Electric Corporation, New York, N. Y., increased \$1,127,119 during 1917 as compared to 1916. This gain, however, as

tions for the same purposes in 1916. The balance in the renewals and replacements reserve on Dec. 31, 1917, for all of the subsidiaries was \$2,355,819, after sundry adjustments.

The current surplus earnings of the subsidiary companies, after paying their preferred stock dividends, amounted to \$1,829,526, of which amount \$1,111,973 was paid out in common stock dividends. The balance, or 39.23 per cent of the current surplus earnings, was appropriated to the renewal and replacement reserves or added to existing surplus. The accumulated surplus of the subsidiary companies, after all adjustments for current and previous years, amounted on Dec. 31, 1917, to \$2,123,392.

National Committee Studying Situation

Country-Wide Organization Is Collecting Data Regarding Utility Needs—Investment Bankers Help

To keep the Washington officials thoroughly posted on what is being done by the public utilities to secure increased rates from the local authorities the National Public Utilities Committee is working diligently through its country-wide organization. This comprises the national committee, P. H. Gadsden, E. K. Hall and H. H. Crowell, and their Washington staff, and 111 representative public utility men, composing the eight regional committees, twenty-eight state committees and the insular committees in the Philippines

Canadian Lines Hold Their Own

The gross earnings of electric railways in Canada for the year ended June 30, 1917, totaled \$30,237,633 as compared to \$27,416,284 in the preceding year, a gain of \$2,821,379, or 10.2 per cent. The operating expenses amounted to \$20,098,637 in 1917 as compared to \$18,099,905 in 1916, an increase of \$1,998,732, or 11.0 per cent. The operating ratio in 1917 was 66.47 per cent, as compared to 67.24 per cent in the preceding year. The net income remained practically the same. A detailed record for the last two years is given in the accompanying table.

COMPARATIVE STATISTICS OF CANADIAN ELECTRIC RAILWAYS FOR YEARS ENDED JUNE 30, 1916 AND 1917

	1916-1917	1915-1916
Mileage, operating.....	1,741.54	1,730.73
Capital stock.....	\$70,606,520	\$67,738,275
Funded debt.....	90,628,219	87,157,349
Gross earnings.....	\$30,237,633	\$27,416,284
Operating expenses.....	20,098,634	18,099,905
Net earnings from operations.....	\$10,139,029	\$9,316,378
Miscellaneous income.....	2,292,200	2,928,173
Corporate income.....	\$12,431,229	\$12,244,552
Taxes, interest, etc.....	7,552,368	7,358,283
Net income.....	\$4,878,861	\$4,886,669
Appropriated to reserves.....	1,285,654	1,535,071
Appropriated to dividends.....	2,468,686	2,834,906
Unappropriated net earnings.....	\$1,124,520	\$516,690
Passengers carried.....	629,441,997	580,094,167
Tons of freight hauled.....	2,333,519	1,936,647
Car mileage.....	84,073,046	82,516,612
Equipment, all kinds.....	4,295	4,442
Employees, all grades.....	11,696	10,622
Salaries and wages.....	\$9,431,685	\$8,767,734

Cleveland Figures Disappointing

The figures of Fielder Sanders, street railway commissioner, for the first five days under the 5-cent fare ordinance at Cleveland, Ohio, indicate that the Cleveland Railway is receiving an increase in revenue of less than 25 per cent, while an increase of 30 per cent will be required to pay the wages of the motormen and conductors and meet the higher costs of operation in other ways. The increase is not meeting Mr. Sanders' expectations. His estimate was \$2,700,000 in five months, but he now believes that more than nine months will be required to accumulate this additional amount unless conditions should change for the better soon.

He attributes the smaller increase to the extremely hot weather, the fact that many persons walk in preference to paying the higher fare and the difficulty in collecting cash fares instead of tickets. He believes, however, that time will remedy these matters. The company will soon have tickets at the rate of five for a quarter and he believes that people will become accustomed to the higher fares and go back to the cars in preference to walking.

The Tayler franchise must be renewed by May 1, 1919, or the city will lose control of the operation of the cars. Mayor Harry L. Davis has indicated an unwillingness to sign a renewal unless the franchise is amended in such a way as to include a penalty against the stockholders of the company when the service is poor or when the rate of fare is increased.

Results with Increased Fares

Railway service in Tacoma, Wash., has not improved despite the 7-cent fare recently established, according to shipyard workers in that city, and the Ship Laborers, Riggers and Fasteners' Union in that city has ordered that legal action be started to eliminate the 7-cent fare. Union officials state that the

action is taken to prevent possible riots, as a result of agitation among the workers.

According to accountants of the Tacoma Railway & Power Company, 7-cent fares have produced an increase in revenue to the company of approximately \$5,418 a week, or about 24.3 per cent, but have decreased the number of passengers about 8.5 per cent. Outside accountants are figuring the increase in wages paid to the men, and a complete statement will be ready shortly for the committee of twenty-five citizens who recommended the fare increase. It is stated that for the week prior to the raise in fares the company's revenues were \$22,268. The second week after the fare increases became effective the revenues were \$27,687. The total passengers carried decreased from 453,714 to 415,164. Transfers increased from 136,111 to 145,080, or 6.6 per cent. This indicates that the short-haul workers that formerly rode are now walking.

Financial News Notes

Stockholders Subscribe for Bonds.—Montgomery & Company and Henry L. Doherty & Company announce that stockholders of the Cities Service Company have subscribed to \$2,100,000 of the \$6,000,000 of Series B 7 per cent convertible debentures recently offered. The formation of the syndicate was noted in the issue of Aug. 10.

Discontinued for War Period.—The San Angelo Water, Light & Power Company, San Angelo, Tex., is not at present operating its electric railway system. The company has about 1

mile of track but no other equipment. The road will probably not be operated again until after the war.

Would Abandon and Sell Line.—The Indiana Utilities Company, which operates 3.75 miles of electric railway between Angola and Lake James, has applied to the Indiana Public Utilities Commission to sell the road for junk. In any event the company proposes to abandon its operation.

Cities Service Earnings for 1917.—The combined gross earnings of the Cities Service subsidiary companies for 1917 were \$69,634,872, with combined net earnings of \$25,454,032. The balance after all interest charges and preferred stock dividends were deducted was \$15,533,580. The electric railway subsidiaries carried 115,657,669 passengers over 374 miles of track.

Hearing on Abandonment Petition.—Chairman Hill of the Public Service Commission for the Second District of New York on Sept. 9 will give a hearing in New York City on the petition of the Westchester Street Railroad for approval of the proposed abandonment of its line from Tarrytown to White Plains and parts of its road in Tarrytown.

Motion to Dismiss Receivership Suit.—The United Railways, St. Louis, Mo., through its attorneys, on Aug. 15 in the United States District Court filed a motion to dismiss the amended receivership petition filed by John W. Seaman of New York a month ago. The motion for dismissal set forth that the amended petition did not state sufficient cause for action, was vague and indefinite and did not allege the same liability on the part of all the defendants. It also asserted that Mr. Seaman did not seek an adequate remedy within the United Railways corporation before going into court. A similar motion to dismiss the original receivership suit filed eight months ago was sustained by Judge Dyer.

Electric Railway Monthly Earnings

COMMONWEALTH POWER, RAILWAY & LIGHT COMPANY, GRAND RAPIDS, MICH.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., June, '18	\$1,831,428	*\$1,162,616	\$668,812	\$505,784	\$163,028
1m., June, '17	1,550,770	*955,369	595,401	427,519	167,882
12m., June, '18	20,789,999	*13,797,411	7,062,588	5,648,168	1,414,420
12m., June, '17	18,147,509	*10,580,010	7,567,499	5,111,143	2,456,356

EAST ST. LOUIS & SUBURBAN COMPANY, EAST ST. LOUIS, ILL.

1m., June, '18	\$318,857	*\$243,468	\$75,389	\$67,915	\$7,474
1m., June, '17	296,753	*198,621	98,132	64,598	33,534
12m., June, '18	3,863,918	*2,810,390	1,053,518	801,618	251,400
12m., June, '17	3,362,412	*2,106,159	1,256,253	767,220	489,033

FEDERAL LIGHT & TRACTION COMPANY, NEW YORK, N. Y.

1m., June, '18	\$271,226	*\$196,786	\$74,440	\$50,699	\$23,741
1m., June, '17	206,827	*165,887	40,940	50,257	19,317
6m., June, '18	1,728,476	*1,154,996	573,480	302,447	271,033
6m., June, '17	1,345,732	*918,910	426,822	293,334	133,488

GRAND RAPIDS (MICH.) RAILWAY

1m., June, '18	\$103,195	*\$79,973	\$23,222	\$19,328	\$3,894
1m., June, '17	104,828	*72,133	32,695	18,972	13,723
12m., June, '18	1,286,089	*942,379	343,710	226,881	116,829
12m., June, '17	1,303,090	*865,153	437,937	211,141	226,796

LAKE SHORE ELECTRIC RAILWAY, CLEVELAND, OHIO

1m., June, '18	\$186,672	*\$126,267	\$60,405	\$36,025	\$24,380
1m., June, '17	152,996	*100,011	53,985	34,207	19,778
6m., June, '18	958,841	*711,565	247,276	217,029	30,247
6m., June, '17	813,922	*\$65,065	248,857	206,043	42,814

LEWISTON, AUGUSTA & WATERTOWN STREET RAILWAY, LEWISTON, ME.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., June, '18	\$86,482	*\$60,642	\$25,840	\$20,338	\$5,502
1m., June, '17	75,669	*\$56,652	19,017	15,678	3,339
12m., June, '18	885,908	*736,714	149,194	202,235	†\$53,041
12m., June, '17	846,133	*626,273	219,860	184,686	35,174

PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.

1m., June, '18	\$632,552	††\$391,558	\$240,994	\$187,746	\$53,248
1m., June, '17	490,652	*\$275,098	215,554	176,699	38,855
12m., June, '18	6,818,090	††\$4,181,568	2,636,522	2,155,699	480,823
12m., June, '17	5,664,193	*\$3,070,129	2,594,064	2,173,776	420,288

CHATTANOOGA RAILWAY & LIGHT COMPANY, CHATTANOOGA, TENN.

1m., June, '18	\$149,073	*\$120,003	\$29,070	\$31,417	†\$2,343
1m., June, '17	128,805	*\$81,223	47,582	29,628	17,953
12m., June, '18	1,552,984	*\$1,354,217	197,867	367,374	†169,507
12m., June, '17	1,301,091	*\$907,416	393,675	357,675	36,000

NASHVILLE RAILWAY & LIGHT COMPANY, NASHVILLE, TENN.

1m., June, '18	\$238,570	*\$154,604	\$83,966	\$40,527	\$43,439
1m., June, '17	194,493	*\$126,143	68,350	40,321	28,029
12m., June, '18	2,566,877	*\$1,646,003	920,874	489,555	431,319
12m., June, '17	2,431,587	*\$1,529,333	902,254	496,976	405,278

*Includes taxes. †Deficit. ††For the month \$18,977; and for twelve months, \$290,512 included for depreciation.

Traffic and Transportation

Indianapolis Hearing Begun

Testimony Presented in Connection with Application for Five Cent-Seven Cent Fare

The hearing of the petition of the Indianapolis Traction & Terminal Company, Indianapolis, Ind., for increased fares was commenced on Aug. 19. The original petition filed in November, 1917, called for the elimination of reduced rate ticket fares and the establishment of a flat 5-cent fare, with the usual transfer privileges.

CASE SLOW IN STARTING

The case has been delayed, owing to the claim of the Public Service Commission that it lacked jurisdiction. The Supreme Court of Indiana, however, on July 30, ruled that the commission has authority to hear the rate increase petition. A supplementary petition was accordingly filed with the commission on Aug. 17, in which the company asks permission to charge a flat 5-cent fare within a central zone of 2½ miles, a 7-cent fare within a zone of 3½ miles, and a 9-cent fare to points beyond the 3½-mile zone, with a charge of 1 cent for all transfers.

It is estimated that only 50 per cent of the theoretical increased revenue from the additional fares will be derived, and that the increase in earnings from the 5-cent fare will be \$225,000, from the 1-cent charge for transfers \$100,000, and from the zones fares \$225,000, a total of \$550,000 a year. The company states that this revenue will be required to meet the increased operating costs and wage increases which the company is now paying, and does not cover a request of the trainmen made a few days ago for an increase in wages to the rate recently established by the War Labor Board for such cities as Chicago, Cleveland, Detroit, etc.

CITY WOULD APPEAL CASE

At the commencement of the hearing before the Public Service Commission on Aug. 19, Samuel Ashby, corporation counsel for the city of Indianapolis, asked the commission to stop the proceedings and file a petition for rehearing before the Indiana Supreme Court, and appeal the case to the United States Supreme Court. He contended that the Supreme Court of the State had erred in asserting that the city of Indianapolis was not a party to the franchise contract, and that for the commission to assume jurisdiction in the fare case under the emergency clause of the utility commission law was a violation of the contractual rights of the city. After a conference, the commission announced that the furnishing of adequate service to a community by a public utility was a matter of greater import-

ance than the technical points at issue, and that it would proceed with the hearing and defer its opinion on the matter of a retrial of the jurisdictional case.

Captain Webb, of the U. S. Ordnance Department, who has charge of the government work in the various manufacturing plants in Indianapolis, testified as to the need of extensions and increased railway service to these plants, and stated that these had been promised by the company when it secured the necessary funds. He stated that the employees at these plants were in favor of paying increased fares if such increase secured them the service they desired.

Testimony was introduced showing that the valuation of the company's physical property as of Dec. 1, 1917, was \$24,018,040. If \$916,170 were added for franchise value, \$2,000,000 for development costs, \$1,200,000 for discounts and \$500,000 for working capital the grand total would be \$28,634,210.

Columbus Goes to Five Cents

The rate of fare in Columbus, Ohio, is now 5 cents, with 1 cent for each transfer and no rebate. The Columbus Railway, Power & Light Company served notice to this effect on the evening of Aug. 20, after having tried in vain for months to induce the City Council to grant an increase that would cover the additional operating expenses brought about by war conditions.

At the same time the company declared its intention to surrender its franchises and a little later filed suit in the Federal Court to enjoin interference with the operation of its cars. Posters were placed in the cars stating that the sale of tickets would be discontinued the next morning and giving the new rate of fare that would be charged.

It is said that many people refused to pay the new rate, on the advice of City Attorney Scarlett, but endeavored to purchase tickets instead. They were allowed to ride free when they insisted. It is probable, however, that this practice will cease within a short time.

Mr. Scarlett has asked the Federal District Court if it intends to "entertain jurisdiction" in the case.

The old rate was eight tickets for a quarter. For months the company has labored to show the City Council that it is an impossibility to operate at that rate under present conditions and keep out of a receiver's hands, but that body twice refused its plea for a temporary increase in the rate of fare and since then has been marking time while conditions for the company have grown worse daily.

Chicago Fare Request

Chicago Surface Lines Asks Fair and Reasonable Rate of Return on Companies' Investment

Confronted with the prospect of financial disaster as a result of the heavy burden imposed by the recent award of the War Labor Board, the Chicago (Ill.) Surface Lines on Aug. 14 asked the City Council to make a recommendation so that a petition may be presented to the State Public Utilities Commission for such an increase in fares as may be necessary to meet existing conditions. The letter of Leonard A. Busby, president of the company, asking the city to join in the petition because of its financial interest in the operation of the road, was introduced at the session of the Council which had just approved an ordinance intended to provide "service at cost." This measure, however, is not expected to become effective for more than a year. The letter was referred to the local transportation committee for consideration.

President Busby points out in the communication that the City Council last May indorsed the application of the union employees for increased wages and that when the matter was later taken up with the War Labor Board the company submitted to its jurisdiction because of such endorsement. The award of the board fixed a wage scale for trainmen ranging from 43 cents to 48 cents an hour and a corresponding increase to other union employees. The amount involved, therefore, will be in excess of \$4,200,000 a year.

The letter also sets forth that gross receipts for the first six months of the current year have decreased more than \$550,000, and material costs have gone up to the extent of at least \$500,000 a year. This means that the added burden will bring about a decrease in net receipts for the year of \$5,700,000 and will fall short of meeting the 5 per cent interest charges on the purchase price by the amount of \$6,250 a day.

Mr. Busby refers to the comments of President Wilson and Messrs. Williams and McAdoo on the situation of public utilities, and he gives a list of railway companies in the larger cities which have already received or are seeking increased fares. He points out that the people of Chicago since Aug. 1 have been receiving service at less than cost.

He says he has been advised by counsel that until the United States Supreme Court decides otherwise the exclusive jurisdiction over the question of rates of fare is now vested in the State Utilities Commission. The company proposes to seek relief from the commission, but before doing so it desires the city authorities to investigate the situation and "determine what increase in the existing rates of fare will be necessary to meet the cost of street railway service in Chicago during the period of the war, including as part of the cost of such service a fair and reasonable rate of return upon the companies' investment."

Six Cents for Key Route

In Decision Allowing Raise It is Estimated One-Man Cars Will Save \$55,806 and Skip Stops \$42,377

The Railroad Commission of California on Aug. 14 fixed a new rate to be charged by the San Francisco-Oakland Terminal Railways on its street cars between Berkeley, Alameda, Oakland, Piedmont, Emeryville and San Leandro, including transfer privileges for trips in the same general direction within those cities, on a basis of 6 cents instead of 5 cents as at present. Additional fares are to be charged on a basis of a 6-cent multiple instead of a 5-cent multiple as now, to points outside the 5-cent zone.

INADEQUATE REVENUES ALLEGED

The application alleged that the revenues derived from operation were insufficient to meet the increased costs of operation and to care for a proper depreciation allowance, and render a fair and reasonable net return on the value of the property used in the operation of the system.

The "Traction Division" of the San Francisco-Oakland Terminal Railways consists of a consolidation of the Oakland Traction Company, the East Shore & Suburban Railway, and the California Railway. The lines serve the cities of Albany, Alameda, Berkeley, El Cerrito, Emeryville, Hayward, Oakland, Piedmont, Richmond and San Leandro and parts of Eden and Oakland Townships in Alameda County. The total track mileage, consisting of 126 miles of main line and 75 miles of second track, is 201 miles, served by thirty-seven operative lines. The entire property consists of 256 miles of road.

The rate of fare as at present charged by the San Francisco-Oakland Terminal Railways is 5 cents between the city limits of Berkeley, Alameda, Oakland, Piedmont, Emeryville and San Leandro, including transfer privilege for trips in the same general direction within the municipalities mentioned. Additional fares on a basis of a 5-cent multiple are charged to points outside of the 5-cent zone.

COMMISSION CONVINCED OF NEED

The commission in its opinion finds that the cost of wages, material and supplies have greatly increased and that additional revenue is necessary to provide for such increased costs and for return upon new capital expenditure which must be made immediately if the street car system is to be maintained to the standard of efficiency necessary to furnish adequate service to its patrons and the large number of communities which it serves. The company's original estimate of the amount required to be so expended on the properties was \$2,883,228.

In view of the necessity for economy, due to the war emergency, the commission has carefully investigated the proposed expenditures and has reduced the amount to \$1,181,979, covering the following items:

Track reconstruction and paving.	\$363,955
Construction of second track on present single-track lines	170,212
New track connections, etc.	55,000
Lines into districts inadequately served	31,600
Equipment:	
25 one-man cars	\$162,500
25 new center-entrance cars for main traffic lines	275,000
10 trailer cars for main traffic lines	55,000
4 dump cars for handling rock, ballast, etc.	8,712
1 electric locomotive	15,000
	\$516,212
Miscellaneous new construction (principally for new feeder lines in outlying districts)	45,000
Total	\$1,181,979

REPRODUCTION VALUE \$9,803,233

The commission finds the reproduction value, less depreciation, of the "Traction Division" to be \$9,803,233, which covers the operative property.

The commission made an independent investigation into the possibility of reducing operating expenses without interfering with the quality of service. Operating economies of \$193,313 a year were suggested and cover the following items:

Adjustment of schedules	\$68,783
Skip-stop plan	
(On basis of 0.143 cent a stop eliminated)	42,377
One-man cars	55,806
Elimination of unprofitable lines	26,346
Total	\$193,313

The economies as suggested by the commission's service inspector have all been placed in effect, with the exception of the recommendations as to one-man cars, and such will result in the reduction of a portion of operating costs without decreasing the quality of service rendered by the company.

PRESENT RATES INADEQUATE

The opinion of the commission contains the following conclusion:

"The requirements of the many communities and patrons of the 'Traction Division' of the company necessitates the operative properties being maintained in a proper state of efficiency that adequate and satisfactory service may be rendered, and it is evident that such efficiency and service cannot be maintained, or given, if the return derived from the rates and charges is not sufficient to meet the necessary and increasing expenses of the company. At the various hearings on this application, no person appeared in protest against an increase in fares or a readjustment of rates as requested by the company, and the investigation made by the commission into the matter of possible operating economies was the only testimony other than that introduced by the company in support of its petition.

"After careful consideration of all the evidence in this proceeding and a minute study of the voluminous exhibits filed by the company, we are of the opinion that the rates as at present charged by the company on its 'Trac-

tion Division' are not productive of adequate revenue to enable the property to be maintained and operated at the proper plan of efficiency satisfactorily to serve the public in the communities in and through which it operates."

The new rate is to be effective within twenty days at the discretion of the company.

Milwaukee Wants More

Companies There Ask Railroad Commission for Increases Outside the Central Five-Cent Area

A petition for further revision of fares in Milwaukee city and suburbs was presented to the Railroad Commission of Wisconsin on Aug. 20 by the Milwaukee Railway & Light Company and the Milwaukee Light, Heat & Traction Company.

In this petition, signed by J. D. Mortimer as president of both companies, the companies ask that their revenues be increased not by raising the single fare above a nickel, but by increasing fares outside of a limited central zone, wherein 5-cent fares are compensatory, so that riders beyond that zone shall pay rates "fairly proportionate to the cost and value of the service rendered."

The petition states that 11,000,000 persons, in 238 American cities are now served by electric railways charging a single fare in excess of 5 cents.

It represents that fare revisions ordered by the commission for the city lines on June 1, 1918, and for suburban lines on July 2, 1918, have failed to produce revenue increases expected by the commission.

It sets forth that the wage standard established by the National War Labor Board for numerous other large cities must shortly be met at Milwaukee and that it will increase yearly operating expenses, an amount equal to 50 per cent of the 10-cents-an-hour wage raise granted to the men on May 1, 1918.

It explains that the companies are unable with their present wage scales, in competition with other local industries, to hire men enough to give the public "the transportation service which the physical property otherwise would afford" that the difficulty in getting men is increasing and the number obtainable is becoming more and more inadequate.

It states that the Milwaukee lines afford transportation to thousands of industrial workers engaged in war production, and that the companies' inability to get men to give maximum car service "tends to retard the efficient prosecution of the war."

It cites the large cost of laying and repairing pavement, of sprinkling streets and of supplying free power to move city bridges, and states that "if the car riders are to continue to pay not only the cost of the service they receive, but also the cost of carrying the above-mentioned burdens, substantially larger increases in fare must be provided than would otherwise be required."

Six Cents for Albany

New York Commission for the Second District Allows Fare Increase for the Period of the War

Six-cent fares were authorized by the Public Service Commission for the Second District of New York to be put into effect on Aug. 19 in all three zones of the territory covered by the United Traction Company, Albany. The decision was rendered on Aug. 14. The new fare schedules will continue in effect as maximum fares until the signing of a general treaty of peace, unless the commission shall otherwise order. The order of the commission apportions the territory of the company into the Albany and Troy zones and interurban zone, and permitted a new schedule of rates to be filed with the commission at once, the new rates to become effective five days after the filing of the new schedules and a notice by the company to the public. Universal transfers, upon the payment of any cash fare, will be restored by order of the commission.

ORIGINAL APPEAL MADE LAST YEAR

The decision in the case was written by Commissioner Frank Irvine. It was rendered on the application of the company, filed with the commission June 25, 1917, and amended May 2, last, by proposing a zone system. The proposed schedules of the company were suspended until Sept. 28, pending an examination of the company's accounts by the commission.

Coincident with the order granting the increased fare, the commission ordered closed the complaint of Mayor John H. McIntyre of Rensselaer against the proposed increase, based on the Barnes law, alleged to limit the rate of fare between points in Albany and Rensselaer to 5 cents.

The settlement of the long pending application was the direct result of action of the cities of Troy and Watervliet in suspending the franchises which limited the rate of fare to 5 cents. Prior action by the commission had been forestalled by the decision of the Court of Appeals in the Rochester case, in which it was held that the Legislature had not authorized the commissions to permit fares in excess of those prescribed in franchise agreements.

COMMISSIONER DISMISSED FOUR QUESTIONS

After describing the properties of the United Traction company and telling of the application of federal officials for special consideration for employees of the Watervliet arsenal, and the subsequent withdrawal of the application, Commissioner Irvine turned to a discussion of the four questions brought up during the hearing of the case. First, the charges of over-capitalization; the Hudson Valley purchase; the charge that the Albany system is in itself profitable, and that Troy patrons alone should care for the securities issued by the individual Troy companies which now underlie the

securities of the entire system. Commissioner Irvine disposed of the over-capitalization charge with the declaration that the corporation is not entitled to sufficient return to pay dividends or interest but to a "fair return on the property used and useful in the public service."

In his conclusion Commissioner Irvine said:

"Having reached the conclusion that the company is entitled to relief in the way of increased revenues, we must ascertain whether the method proposed of effecting the increase is just and reasonable. The Troy zone, while is a group of politically separated municipalities, is compact and might for most purposes except those of government be treated as one community. In fact the industrial and social—using the latter term in its broader as well its narrower sense—interests of those municipalities blend together to a large extent. Indeed, the cities of Troy and Watervliet and the village of Green Island, in adopting the resolutions waiving the fare restrictions in their respective franchises, have insisted that a common rate should be adopted in the group constituting the Troy zone.

THE MUNICIPALITY THE UNIT

"What is said of the Troy zone applies also to the cities of Albany and Rensselaer, but perhaps not to the same extent. We must remember, however, that section 181 of the railroad law makes the municipality the unit and we cannot relieve the company from the operation of this section without finding that in the particular municipality affected the income is insufficient to yield an adequate return. The operating expenses have not been segregated by municipalities. The uniform system of accounts has not required that they should be so segregated and a complete segregation, except as many items of expense might be roughly and inexactly apportioned, is impossible. The travel in the Troy zone is so largely from one municipality to the other that it may be safely assumed that the same conditions apply substantially in each. It has not been claimed as to this zone that there is any substantial difference in operating results as between the different municipalities. It must be inferred that the inadequacy of return so far as it is applicable to this zone distributes itself fairly evenly among the municipalities composing it. Certainly there is no ground for any inference that the company operating in any single one of these municipalities could operate at profit at present prices."

The order of the commission follows substantially in full:

"On the facts found and for the reasons stated in the accompanying opinion it is ORDERED (1) That the United Traction company be and it is hereby authorized to increase its one-way fares for passenger

travel over its lines as hereinafter prescribed in the following described zones, subject to conditions herein provided:

Local Zone (a):

From 5 cents to 6 cents. This zone includes all points within the city of Albany, including point known as Garbrance Lane, in the town of Colonie; also all points within the city of Rensselaer. For travel between points in this zone requiring the use of two car lines, free transfers to be given and accepted.

Local Zone (b):

From 5 cents to 6 cents. This zone includes all points within the cities of Troy, Cohoes, and Watervliet, also the villages of Green Island and Waterford, including points intermediate between said cities and villages in the towns of Colonie and Waterford. For travel between points in this zone requiring the use of two car lines, free transfers to be given and accepted.

Through Zone (c):

This zone includes points intermediate between the Plaza, terminal point in the city of Albany, and Franklin Square, terminal point in the city of Troy, or the through line terminal point in the city of Cohoes. For travel between said points, the fare is not to exceed 12 cents. Between said terminal point in Albany and point in the town of Colonie known as Schuyler bridge, including points intermediate between said points, the fare is not to exceed 6 cents; and between said terminal point in the city of Troy or in the city of Cohoes and a point in the town of Colonie known as Garbrance Lane, including points intermediate between said points, the fare is not to exceed 6 cents. Free transfers to be given for through travel between points in zone (a) and points in zone (c) intermediate between Albany and Schuyler bridge, also between points in zone (b) and points in zone (c) intermediate between Watervliet and Garbrance Lane when such travel involves the use of a local car line and a through car line. The foregoing transfer regulations in combination will apply to through travel between points in local zone (a) and points in local zone (b) when the travel involves the use of car lines operating in both said local zones and the through car line operating in through zone (c).

The fare schedule prescribed in this order shall continue in effect as maximum fares until the signing of a general treaty of peace unless the commission shall otherwise order.

NO DIFFICULTY WITH NEW FARE

The 6-cent fare went into effect on the lines of the company on Aug. 19. The company notified the general public through posters in the cars and advertisements in the local papers, asking their co-operation in assisting the employees of the company to make the collection of the fare with as little delay as possible to the railway service.

Anticipating a large demand for pennies, the company provided 200,000 pennies for the conductors, but the advertising to the public to have a penny ready with the nickel was productive of so much good that 75 per cent of the passengers on Aug. 19 deposited the nickel and penny in the fare box and did not have to ask the conductors for change. Only about \$200 worth of pennies were used on that day for change, while more than this amount in pennies was turned in by the conductors with their fare receipts.

On Aug. 20 practically no pennies were given out by the conductors. The delays to the service on account of the new fare conditions were very few, all car lines being maintained practically on time during the day.

The United Traction Company operates 111 miles of electric railway in Albany, Rensselaer, Troy, Cohoes, Watervliet, Green Island and Waterford.

Buffalo Vote Unfavorable

Six-Cent Fare for International Railway Lost at the Election on Aug. 20

The resolution adopted by the City Council of Buffalo, N. Y., on June 18, last, waiving certain franchise restrictions and allowing the Public Service Commission for the Second District, to fix an equitable rate of fare to be charged by the International Railway on its city lines, was repealed by the voters of the city at a special referendum election on Aug. 20. The vote on the question was 35,661 for the repeal of the City Council's action and 7,044 to uphold the Council.

The action of the voters means that the International Railway cannot charge a fare higher than 5 cents on its city lines and indicates that the voters of the city intend to hold the company to the terms of its franchise. The defeat of the 6-cent fares also means that the platform men employed by the company will not receive the increase in wages of 6 cents an hour over the present scale recently awarded them by the War Labor Board. This award was made contingent on the fact that the voters uphold the City Council, which as stated previously, agreed to waive certain franchise restrictions and allow the state utilities board to fix a higher rate of fare.

E. G. Connette, president of the railway, says that no statement will be issued by the company until after a meeting of the board of directors which will be held within the next week. Mayor Buck has served notice upon President Connette that if the company's board of directors votes to withdraw the wage increase to the employees and there is danger of a strike, he will appeal to the courts for the appointment of a receiver for the company's city lines.

The repeal of the Council's action is the culmination of litigation involving the legality of the council's right to pass a resolution waiving certain franchise restrictions and also involving the voters' right to hold a referendum on the question. The first decision in favor of the voters came from the Supreme Court of Erie County. This decision was upheld by the Appellate Division of the Supreme Court and by the New York State Court of Appeals. The referendum is the first special election ever held under the new commission charter and it is the first time women have voted in Buffalo under the equal suffrage law. Only 17,781 women registered and a small percentage of them voted at the referendum. The total vote at the referendum was 42,705. The special election cost the city between \$30,000 and \$35,000.

When the results of the election became known, every newspaper except one indirectly criticised the voters for their attitude on the issue involved.

On the day before the referendum election, all of the large banks of the city issued a public statement urging voters to uphold the action of the City

Council and allow the International Railway to charge a higher rate of fare. The banks said the increase in fares was imperative because of higher operating costs, increased wages, etc. Those who opposed the higher fares in a final statement to the voters called attention to the fact that the dividends of the International Railway for the last five years had averaged 8 per cent, "which is equivalent to nearly \$4,000 a day."

Detroit Case to Supreme Court

Attorneys representing the Detroit (Mich.) United Railway have appealed directly to the United States Supreme Court for an injunction to restrain the city of Detroit from enforcing the ordinance requiring 5-cent fares, six-for-a-quarter tickets and eight-for-a-quarter workingmen's tickets. The attorneys found Chief Justice William Day at Mackinac Island. He issued an order for the hearing of the case on its merits in his home city, Canton, Ohio, on Sept. 10. The city of Detroit has until Aug. 31 to answer the company's bill.

In the meantime the company is enjoined from violating the 5-cent ordinance by an order which was issued by the local circuit court. The company appealed directly to the United States Supreme Court, an unusual procedure, after the local federal court had refused to take any action in the matter.

Although the company is accepting 5-cent fares it is not selling six-for-a-quarter tickets, these tickets not yet having been received from the printers.

The company this week announced that it has stopped work on the new line to the Ford plant where "Eagle" submarine chasers are being built and has also quit work on all other construction jobs. The company explained that it was necessary to halt all such work because the present revenue, under 5-cent fares, did not produce enough money to carry on these jobs.

Several months ago when the "Eagle" line was proposed, company officials stated that the question of financing the new extension would be bothersome. An officer of the Ford Motor Company announced at a meeting of the Common Council committee on public utilities that if necessary his company would finance the project. This week when work on the line was stopped members of the Council criticized the railway, declaring that the company had not taken advantage of the financial assistance offered by the Ford people. The company then produced letter written to the Ford Company last May asking financial assistance in building the line. The Ford Company to date has not replied to these letters and has not made an offer of financial assistance.

Council members have been talking about a variety of reprisal measures against the company but at the meeting on Aug. 20 no new measures were presented.

Skip Stops for Kansas City

With 20,000 Fewer Stops a Day Local Railway May Save 15,000 Tons of Coal a Year

Kansas City, Mo., claims the distinction of being one of the first cities in the United States to experiment with the "odd and even" system of staggering car stops. Its early experience with the plan was described in the issue of this paper for April 11, 1914, page 850. and in prior issues. In May, 1911, after exhaustive tests, it introduced the alternate stop on the Troost Avenue and Brooklyn Avenue lines. Metal signs marked "odd" and "even" respectively, were placed on the front end of cars, indicating that the cars stopped at odd and even-numbered city streets respectively.

As at that time there were no exorbitant prices or shortage of coal no special attempt was made to extend the "odd and even" operation to other lines of the company. During the winter of 1917-1918, however, a very acute shortage of coal made the further introduction of skip-stops a highly desirable step. At an informal conference in March, 1918, the Public Service Commission of Missouri indicated its approval of any skip-stop plan that might be agreed upon by the company and the city. Shortly thereafter a report on the subject was submitted to the City Council by Robert P. Woods, city member of the Board of Control. This indicated that the average distance between stops on some thirty lines of the company could be increased from 422 ft. to 598 ft.

ORDINANCE PASSED ON AUG. 12

The report was referred to a joint committee of both houses and several public hearings were held, little protest being lodged against the plan when it was properly understood. Both State and National Fuel Administrators as well as Mayor Cowgill, favored the plan, and an ordinance permitting its use was passed on Aug. 12.

At all car stops the steel posts supporting the overhead are being marked with 3-ft. white bands bearing the words "Car Stop" in black letters arranged vertically. Where no stops are made 1 ft. 6. in. black bands with the words "No Stop" are being displayed. Where a safety stop and either a "Car Stop" or "No Stop" come at the same point an 8-in white band is being painted on the post 4 in. above other sign.

The skip-stop plan is being applied to practically all lines of the Kansas City Railways. Explanatory advertisements have been inserted in the daily papers and a large sheet measuring 25 in. x 28 in., showing by lines every stop which will be made and indicating by "NS" and "FS" whether it is near side or far side, has been displayed in prominent places. It is estimated that 20,000 stops a day are being eliminated with a resulting saving of approximately 15,000 tons of coal a year to the company.

Jersey Case Before Supreme Court

A suit has been filed in the Supreme Court of New Jersey by Charles F. X. O'Brien, Jersey City, to review the order of the Board of Public Utility Commissioners by which the Public Service Railway was authorized to charge 1 cent for an initial transfer to its patrons from Aug. 1. Marshall van Winkle, who opposed the granting the new rate for the New Jersey League of Municipalities, is counsel for O'Brien, whose suit is that of an individual. Under the appeal filed all the important legal points urged by the league against the granting of any increase by the commission are taken up for review.

It is set up that there was no evidence before the commission to support the order whereby the company is now charging 1 cent for initial transfers; that the board had no jurisdiction in the case to allow the increase; that there was no determination of the value of the Public Service Railway by the commission for rate-making purposes; that the commission did not determine what is a fair rate of return upon the value of the company's property, and that the order of the commission abrogates a number of franchise contracts between the Public Service Railway and Jersey City, providing that the company give service for a fare not to exceed 5 cents, and with free transfers.

The scope of the appeal involves the question of whether the Public Utility Commission in applications from utility companies for emergency relief has power to increase rates without a complete rate-fixing valuation of the property of the petitioning utility. It also goes into the more important question as to whether the commission has the power to abrogate franchise obligations of utilities with municipalities to render service at maximum rates of fare in consideration for franchise privileges.

Skip Stops for All Cities Over 25,000 Population

All cities in the United States of 25,000 population and above will soon be putting into effect skip-stop plans worked out in conjunction with the Fuel Administration, according to advices from the Washington correspondent of *ELECTRIC RAILWAY JOURNAL*. It is estimated that a coal saving at the rate of 2,000,000 tons a year will be effected.

The skip-stop will go into effect in Chicago on Aug. 25; and in Kansas City the new system is just being started, under an ordinance passed Aug. 12. The Fuel Administration now has the subject up actively with all other large cities, and the Administration is asking that the railway companies of the country do all they can to assist.

In this connection, the Fuel Administration is encouraging the use of power-saving devices.

Britton I. Budd, head of the Chicago Elevated Railways, has written a letter to officials of the Fuel Administration, in which he says that for the six months of the present year the power saving device in use on this system led to a saving in coal of 11.98 per cent, or 16,867 tons. At \$3.17 per ton, this amounted to a saving of \$53,468.

Transportation News Notes

Voters Reject Six-Cent Fare.—The voters of Birmingham, Ala., at the recent election defeated the 6-cent fare provision for the Birmingham Railway Light & Power Company.

Lawrence Would Increase Fares.—Officials of the Kansas Electric Utilities Company, operating 10 miles of electric railway in Lawrence, Kan., recently announced that they would apply to the City Commissioners there for permission to increase fares to 7-cents.

Six-Cent Fare for Jersey Road.—As an emergency war surcharge the 5-mile beach electric railway, which serves Wildwood, N. J., and adjacent territory, has been authorized by the Board of Public Utility Commissioners to put into effect a 6-cent fare. The rate has been 5 cents.

Chattanooga Wants Six Cents.—Application for a change in the present franchise held by the Chattanooga Railway & Light Company, Chattanooga, Tenn., so that the company may be permitted to charge a 6-cent fare instead of 5 cents was proposed to be made on Aug. 6.

Six Cents for Macon.—The City Council of Macon, Ga., on July 31 passed an ordinance allowing the Macon Railway & Light Company to charge 6 cents for fare until one year after the war, when the fare will automatically return to 5 cents. The action of the Council was unanimous.

Fare Petition Withdrawn.—The Little Rock Railway Electric Company, Little Rock, Ark., has withdrawn its petition asking the City Council to grant a franchise amendment permitting a fare increase from 5 cents to 6 cents. Mayor Charles E. Taylor announced that he would veto the amendment if it passed.

Kankakee Road Asks Six Cents.—The Kankakee (Ill.) Electric Railway has filed a petition with the Public Utilities Commission of Illinois asking for an increase in fares from 5 cents to 6 cents. It is expected that the North Kankakee Electric Light & Railway Company will file a similar petition.

Reading Wants Another Increase.—The Reading Transit & Light Company, Reading, Pa., on Aug. 6 gave

notice that it was preparing to ask for another increase in fares from 6 cents to 7 cents in Reading and Lebanon. The fares on the remainder of the system have been increased to 8 cents.

Shore Line on Steam Road Basis.—The Shore Line Electric Railway, Norwich, Conn., on Aug. 21 was granted authority by the Interstate Commerce Commission to increase passenger fares between points on its line in Massachusetts and Rhode Island, provided the fares do not exceed those charged on railroads under federal control.

I. C. C. Approves Rhode Island Fares.—The Interstate Commerce Commission has authorized the Rhode Island Company, Providence, R. I., to adopt zone fares between Providence and Massachusetts points which were recommended by a special committee's report to the Rhode Island General Assembly in March last.

City Commission to Have Authority.—The legal department of the city of Fort Worth, Tex., has drafted an ordinance which will be enacted immediately giving the City Commission authority to compel public utility corporations operating under municipal franchise to make extensions and betterments of service as ordered by the commission.

Joint Rates Suspended.—The Public Service Commission of Oregon, recently issued an order suspending a 25 per cent joint rate increase of the Portland Railway, Light & Power Company, Portland, Ore., and the Willamette Valley Southern Railway, Oregon City, Ore. The suspension is for ninety days or pending a hearing to ascertain if the rate is justified.

Fare Increase for DeKalb-Sycamore Road.—An increase of fares has been allowed the DeKalb, Sycamore & Interurban Traction Company, DeKalb, Ill. The order of the Public Utilities Commission of Illinois abolishes all round-trip tickets and increases the sale price of coupon books from \$3.75 to \$4.25. The fare of 15 cents from DeKalb to Sycamore will remain as heretofore.

Butte Wants Ten-Cent Fare.—The Butte (Mont.) Electric Railway has filed with the State Utilities Commission a schedule of the increased rates it desires to have placed in effect. It asks for a 10-cent fare with transfer privileges within the city limits, or a fare of 6½ cents when tickets are purchased in blocks of four. It states these new rates are to cover all traffic heretofore subjected to a 5-cent fare.

Skip Stops in San Francisco.—Both the United Railroads and the Municipal Railway, San Francisco, Cal., on Aug. 20 put into effect the skip-stop plan in the Sunset and Park-Presidio residence districts of San Francisco. Yellow bands have been painted on poles to mark the corner at which stops will be made. For the present the skip-stop plan will be applied only to the short blocks in the western part of the city.

Chautauqua Traction Hearing Soon.—The Public Service Commission for the Second District of New York has referred to Commissioner Fennell for investigation the complaints by patrons against the proposed increased rates of the Chautauqua Traction Company and the Jamestown, Westfield & Northwestern Railroad, and it is expected that a date for a hearing in Chautauqua County will soon be announced.

More Dallas Lines Skip-Stops.—Announcement is made by Richard Meriwether, general manager of the Dallas (Tex.) Railways, that the skip-stop system will be extended to five more lines at once. Signs have been placed along the lines indicating stops, and formal announcement of the inauguration of the service was made by the distribution of cards by conductors to every person who rode on these cars on the two days before the new plan went into effect.

New Denver & Interurban Fare.—The Denver & Interurban Railroad, Denver, Col., had its application for fare increases allowed by the Public Utilities Commission of Colorado on Aug. 7. The one-way fare will now be 3 cents a mile with a round-trip rate of 10 per cent less than twice the one-way fare. Commutation rates have been increased 10 per cent and an excess fare charge of 5 cents has been granted for fares paid on trains at stations where agents are provided. The previous rate of fare on the interurban line was 2½ cents per mile.

Seranton Wants Eight Cents.—The Scranton (Pa.) Railway on Aug. 16 filed a new tariff with the Public Service Commission of Pennsylvania providing for an increase in fares in all zones from 6 cents to 8 cents. W. E. Boileau, general manager of the company, stated that the 8-cent fare is necessary to keep the cars going. The increase in wages granted recently by the War Labor Board will add \$320,000 more expense to the company and wages on the new basis cannot be paid on less than an 8-cent fare.

Action on Binghamton Appeal Put Over.—A large delegation of employees from the Binghamton (N. Y.) Street Railway was present at the Council meeting on Aug. 12 expecting that some action would be taken on the petition of the company, asking for a suspension of the franchise rights of the taxpayers relative to a 5-cent car fare rate during the period of the war, and as long thereafter as the Public Service Commission deems necessary, but no action was taken except that the committee to which the petition was referred asked for an extension of time to consider the matter further and render a report at the next meeting of the Council.

City Inquiry Into Tacoma Fare.—In an investigation of the 7-cent railway fare in Tacoma, Wash., Fred Shuemaker, commissioner of finance, presented to the Tacoma Railway & Power Company, a questionnaire for the company to fill out. Among other ques-

tions, Commissioner Shuemaker asks why the company has spent three times as much money advertising its traction interests in Tacoma as has been spent in Seattle and Bellingham; why the company continues to pay 8 per cent interest on a \$4,000,000 open account with the Puget Sound Electric Company, of which it is but a branch, and why this debt is not bonded at 5 per cent.

Fare Increases on Doherty Properties.—Henry L. Doherty & Company, New York, N. Y., in a bulletin dated Aug. 5 reviewed rate increases on properties under their management. On electric railway properties they list the following changes: Cumberland & Westernport Electric Railway, Cumberland, Md., has been granted an increase amounting to 20 per cent. Meridian Light & Railway Company, Meridian, Miss., has increased its fare from 5 cents to 7 cents, with a charge of 25 cents for four tickets instead of six as formerly. Bartlesville (Okla.) Interurban Railway has been authorized to charge 7 cents in the former 5-cent zone and 14 cents in the former 10-cent zone. Toledo & Western Railway, Toledo, Ohio, has been granted permission to charge 2½ cents a mile instead of 2 cents. Toledo Railways & Light Company, Toledo, Ohio, now charges a straight 5-cent fare instead of 6 tickets for 25 cents and also charges 1 cent each for each transfer.

Twin City Fare Appeal Made.—The City Council of Minneapolis, Minn., has voted to interpose no objection if the Twin City Lines wishes to present its request for a 7-cent fare to the National War Labor Board to adjust. Action was held up one week by motion to reconsider. Agreement on a 7-cent fare was not reached at a joint meeting of representatives of both St. Paul and Minneapolis Councils attended by Horace Lowry, president of the railway, who explained the necessity for a wage increase and the critical position of the company if quick action is not taken. The St. Paul men said any change in the franchise in that city requiring a 5-cent fare must be presented to the people. Several Aldermen insisted at the meeting that a valuation of the railway property was a starting point. Although it was voted to appoint a committee from each Council to consider the whole matter, the Mayor of Minneapolis is the only one to name such a committee. Joint action under the circumstances seems unlikely.

Fonda-Johnstown Would Increase Fares.—The Public Service Commission for the Second District of New York announced that on July 30 it would give a hearing upon a tariff of the Fonda, Johnstown & Gloversville Railroad proposing to put into effect a 3-cent-a-mile passenger fare. The hearing was announced after the filing of a petition by the company in which it was stated that additional revenue must be received. The petition was also accompanied by proofs of pro-

posed new tariffs showing that the proposed passenger fares are to be practically the same as those charged by the company during the period that it was under federal control. These tariffs it proposes to put into effect as to intrastate traffic on Aug. 1, and interstate traffic on Aug. 30. The petition states that no increase in volume of business is anticipated and that the only way by which revenues can be increased is by maintaining the increase in freight rates and by allowing an increase in passenger fares over those now in force, including city fares.

Passenger Decrease Follows Fare Increase.—The quarterly statement of the Indianapolis & Cincinnati Traction Company, Indianapolis, Ind., filed on Aug. 13 with the Public Service Commission of Indiana as required by the commission when an increase in passenger rates was granted the company last January, shows that decreased rather than increased revenues have resulted for the period of April, May and June. The total passenger revenue for this quarter in 1918 was \$106,288 as compared with \$107,256 for the same period in 1917. The percentage of decrease is 0.9 per cent. Total operating expenses show an increase of 11.31 per cent for the quarter ending June 30, 1918, as compared with the same period of 1917. Total gross earnings show an increase of 4.53 per cent. Total gross income, less operating expenses, shows \$31,713 as compared with \$35,061 for the corresponding quarter in 1917. The losses in passengers riding are: 19 per cent in April, 20 per cent in May, and 23 per cent in June. The freight business for the same months showed an increase respectively of 51, 57 and 65 per cent.

New Rates Allowed Lake Erie Line.—In the fare case of the Buffalo & Lake Erie Traction Company, Buffalo, N. Y., the Public Service Commission of Pennsylvania has handed down a decision in which it is held that an interurban electric railway may increase its rates beyond the 5-cent fare limit specified in a franchise ordinance when necessary to obtain sufficient revenue for operating expenses and to return to the stockholders a reasonable profit on their investment. Complaints were filed with the commission by the authorities of North East Borough, Harbor Creek and North East Townships in Erie County, which are connected by the line in question, against proposed increases in rates. The commission made a physical examination of the company's properties in Pennsylvania and the decision handed down is based on the valuations. The commission fails to find the discrimination alleged and decides that since rates on adjacent lines radiating from the city of Erie have been increased proportionately, the Buffalo & Lake Erie Traction Company has been unable under the present tariffs to set aside any funds for depreciation and earnings have been greatly reduced, the increase asked is justified.

Personal Mention

A. J. Bray has been appointed auditor of the Michigan Railway, Jackson, Mich., to succeed H. G. Kessler.

Miss Mary T. West has been chosen active secretary of the Board of Public Utility Commissioners of New Jersey to succeed Alfred N. Barber, who is seriously ill.

J. H. Stott, formerly engineer of cable equipment of the United Railroads, San Francisco, Cal., is now in charge of the North Beach Station of the Sierra & San Francisco Power Company, San Francisco, Cal.

George H. Smith has resigned as chief engineer of the Rockford & Interurban Railway, Rockford, Ill., to become connected with the Bay State Street Railway, Boston, Mass., as assistant to W. S. Hubbard, superintendent of roadways and buildings of the company.

Edward A. Higgins, a member of E. F. Higgins & Company, electrical contractors, has been selected by Mayor John W. Lawson for appointment as a member of the Board of Public Utility Commissioners of Wilmington, Del., representing the Fourth Representative District to fill the vacancy caused by the resignation of Frank Mock.

Paul P. Haynes of the Public Service Commission of Indiana, has been appointed a member of the special war committee of the National Association of Railway & Utilities Commissioners, with headquarters in New York City. Mr. Haynes succeeds Max Thelen, chairman of the Railroad Commission of California, who has resigned to become surveyor of contracts in the War Department.

W. M. Holtz, chief of the medical bureau of the Pittsburgh (Pa.) Railways, has recently entered the medical reserve corps and is now a captain stationed at Camp Greenleaf, Ga. Dr. Holtz described in the *ELECTRIC RAILWAY JOURNAL* for May 5, 1917, how the Pittsburgh Railways and affiliated companies have built up cordial relations with local physicians and how the companies care for injured employees and the methods they use to promote their welfare.

Charles A. Stanley, for the last five years in charge of the department of commercial engineering of the Kansas Gas & Electric Company, has been appointed general superintendent of the Arkansas Valley Interurban Railway, Wichita, Kan. Mr. Stanley is a graduate of the General Electric expert course, and spent ten years in the General Electric shop in charge of railway testing and design. Since that time he has served as a railway appraisal engineer and has been connected with several companies operating electric light properties.

Mr. Casey in Washington

New Superintendent of Transportation Has Grasp of Washington Problems Through the Reeler Traffic Studies

William M. Casey, whose appointment as superintendent of transportation of the Washington Railway & Electric Company, Washington, D. C., was noted briefly in the *ELECTRIC RAILWAY JOURNAL*, of Aug. 10, page 264, was formerly superintendent of transportation of the Denver (Col.) Tramway. At the time of his leaving Denver, at the end of 1916, and until his new appointment. Mr. Casey was on the staff of John A. Beeler, consulting engineer, who is advising the Public Utilities Commission of the District of Columbia on traffic problems in the capital. Mr. Casey was born in



W. M. CASEY

Ireland in 1870. At an early age his parents brought him to America, settling in Lawrence, Mass., where Mr. Casey was educated in the public schools. In 1888 he went West and enlisted in the United States Army, the chief occupation of which at that time was the stamping out of insurrections of the various hostile tribes of western Indians. As a sergeant Mr. Casey participated in the defense of the Blue Ridge Agency in December, 1890, in which Sitting Bull was one of the principal actors on the other side. Mr. Casey qualified as a sharpshooter and had the reputation of being one of the best of the famous Seventh Regiment of the United States Infantry. He also had the distinction of being pronounced by General Merriam, under whom he served, as one of the best drill masters in the service. After securing an honorable discharge from the army Mr. Casey sought employment with the Denver City Cable Company, and in 1892 worked as motorman and conductor on the old Larimer Street Line. In

1893 he was promoted to carhouse foreman. In 1902 he was advanced to the position of division superintendent of the Denver Tramway Company. In 1909 the company further advanced him to the position of trainmaster in charge of traffic and discipline and later to the position of general superintendent of transportation. Mr. Casey is recognized as one of the best qualified transportation men engaged in electric railway work. His keen insight into human nature and his early army training have been of great value to him in training others and in maintaining discipline.

J. Kappeyne, formerly chief engineer of the Public Utilities Commission of the District of Columbia, has recently been appointed transportation engineer to the United States Fuel Administration for the State of Illinois, with headquarters in Chicago. Means for promoting the conservation of fuel by the various electric railways of the State will be worked out by Mr. Kappeyne.

Increase for New Bedford & Onset Road

The Public Service Commission of Massachusetts has issued a finding approving a general fare increase on the New Bedford & Onset Street Railway, subject to modification with respect to the use of tickets. The cash fare on lines was formerly 5 cents, with a ticket rate of 4 1/6 cents. In 1915 the commission allowed the fare to be increased to 6 cents and the ticket rate to 5 cents, and since Sept. 3, 1917, the fares have been on a straight 6-cent basis. The company now claims that its income is still insufficient and the latest schedule filed calls for a cash fare of 7 cents, with a ticket rate of 6 cents upon certain designated portions of the system.

The board's investigation indicates that the company is entitled to an increase of at least \$25,000 in gross revenue, even if no allowance be made for depreciation or for a return upon the floating debt, which has never received the indorsement of the commission.

Under the company's schedule single tickets for 6 cents each are available in the aggregate on 13 1/2 miles of the company's total trackage of about 37 miles. The distances for which they may be used are in all cases less than a regular fare zone; they are used between all points where there is an appreciable amount of daily riding; and the density of traffic is greater than on other portions of the system. The propriety of permitting a different rate of fare under such conditions has been generally recognized in previous rate cases and cannot be regarded as discriminatory. The finding states:

In addition to these single 6-cent tickets, the company proposes to issue a through round-trip ticket for 60 cents, representing a 6-cent rate for each fare zone, between the Narrows Bridge, Wareham and the Fairhaven-Mattapoisett line, where connection is made with the Union Street Railway, New Bedford.

Construction News

Construction News Notes are classified under each heading alphabetically by States. An asterisk (*) indicates a project not previously reported.

Franchises

Mobile, Ala.—The Mobile Light & Railway Company will ask the City Council of Mobile for a franchise to build an extension to the government shipyard now in course of construction at Frascati.

San Pedro, Cal.—The Pacific Electric Railway has accepted a franchise for the construction of connecting tracks linking the old Los Angeles Traction Company line to San Pedro with the Pacific Electric Railway tracks on Vermont Avenue between 116th and 117th Streets. The proposed tracks will make it possible for the Pacific Electric Railway to resume traffic to the harbor from the southwest section of the city.

Toledo, Ohio.—The Toledo Railways & Light Company has asked the City Council for a franchise to construct an extension on certain streets adjacent to the proposed site of a new nitrate plant in Toledo. The proposed extension will be in the nature of a loop service that will provide transportation of materials and supplies to the plant, as well as furnish residents of that portion of Toledo with street car connection with the city proper.

Norfolk, Va.—The Board of Aldermen of Norfolk has granted five new permits to the Virginia Railway & Power Company for the construction of extensions of its lines in Norfolk.

Track and Roadway

Edmonton (Alta.) Municipal Railway.—The City Council of Edmonton has authorized the placing of new crossings on Jasper Avenue from 102d to 108th Streets at a cost of \$1,150, and some track repairs on Saskatchewan Avenue, at a cost of \$800.

Northern Electric Railway, Chico, Cal.—The City Commission of Sacramento has refused to grant the petition of the Northern Electric Railway to abandon its service to McKinley Park.

Pacific Electric Railway, Los Angeles, Cal.—A decision has been rendered by the Public Utilities Commission of California ordering the Pacific Electric Railway to construct, maintain and operate a branch railroad track about 350 ft. west of the west switch of its present passing track west of Onawa Station, Elliottsville, southwest of the quarry of the Superior Dark Granite

Company, of sufficient capacity to accommodate not less than three freight cars, the entire cost thereof to be borne by the Superior Dark Granite Company.

Savannah (Ga.) Electric Company.—Improvements on a few city lines will be begun by the Savannah Electric Company following the completion of the extension to Port Wentworth.

Rock Island Southern Railroad, Monmouth, Ill.—The Rock Island Southern Railroad is again operating with only partial loss of schedule following the burning of its power-house which supplied power for its lines between Galesburg and Monmouth. A report that the company would substitute steam for electricity is without foundation. The entire equipment of the power house, as well as the building, was destroyed. Power to operate cars between Monmouth and Galesburg is being purchased from the Galesburg Railway, Lighting & Power Company.

Jefferson County Traction Company, Beaumont, Tex.—Amendments to the charter of the Jefferson County Traction Company have been filed in the office of Secretary of State at Austin by C. R. Wharton, attorney for Stone & Webster. The amendments authorize a change of name of the corporation to the Eastern Texas Electric Company and permit the new corporation to acquire all the property and franchises of the Beaumont Traction Company, Beaumont Electric Light & Power Company, Jefferson County Traction Company, Port Arthur Traction Company and the Port Arthur Light & Power Company. The changes to be made in the organization of the company were noted in the *ELECTRIC RAILWAY JOURNAL* for Aug. 17, page 304.

Northwest Traction Company, Seattle, Wash.—The Board of Public Works at Seattle, Wash., has agreed to ask the interurban railways operating out of Seattle to Tacoma and Everett to vacate Fifth Avenue, between Pike and Pine Streets, and Occidental Avenue, between Yesler Way and Washington Street, as terminals, and seek new locations. This move was taken as a result of the recommendation of Charles R. Case, superintendent of streets, who states that the use of the streets by the Northwest Traction Company was without authority and results in serious congestion of traffic. The board will require the company to vacate within ninety days.

Seattle (Wash.) Municipal Railway.—The City Council of Seattle has passed an ordinance providing for the issuance of \$1,200,000 of utility bonds for the construction of an extension of the Seattle Municipal Railway from the city limits north of Green Lake to connect with the elevated line and thence

to the Lake Burien line which runs beyond the southern city limits. The plan contemplates the construction of the line from East Eighty-fifth Avenue to Tenth Avenue Northeast, south on the latter street, across the Tenth Avenue northeast bridge, now under construction, to Fuhman Avenue, and thence south over the tracks of the Seattle & Rainier Valley Railway to First Avenue South and Washington Street, where the extended line will connect with the elevated railway. It may be necessary to construct a bridge along the east side of Lake Union where the line will skirt the shore, as the Fairview Avenue bridge is not wide nor strong enough to carry cars.

Municipal Railway, Tacoma, Wash.—One of the causes of delay on the Municipal Railway through Ballard will be eliminated by double-tracking of about ten blocks of the line, beginning at the end of the present double track at Twentieth Avenue and Leary Street. The city is also building a side track at Thirty-Second Avenue, N. W., and West Eighty-Fifth Street, which will later be extended to make a loop at the end of the Ballard line.

Shops and Buildings

Pacific Electric Railway, Los Angeles, Cal.—A contract has been awarded by the Pacific Electric Railway to Kling Company, Los Angeles, for the construction of a reinforced concrete freight and passenger station, 36 ft. x 92 ft., at Fullerton, to cost about \$6,400. Plans are now being prepared by the company for the construction of a new passenger and freight station at San Pedro. The structure will be 80 ft. x 100 ft., part one story and part two story, of brick or hollow tile.

Kansas City, Mo.—The Interurban Central Station Company, Kansas City, Mo., has taken the deeds to the property necessary for the building of a union interurban passenger terminal to be used by all interurban railways entering Kansas City. The proposed location bounded by Ninth, Tenth, McGee and Oak Streets is adjacent to the heart of the business district.

Power Houses and Substations

Turners Falls Power & Electric Company, Turners Falls, Mass.—The Turners Falls Power & Electric Company, which supplies energy to the Springfield Street Railway, has awarded a contract to Fred T. Ley & Company, Springfield, for improvements to its plant.

Springfield Gas & Electric Company, Springfield, Mo.—Plans are being prepared by Sanderson & Porter, engineers, New York, for the construction of a new power plant for the Springfield Gas & Electric Company.

Manufactures and the Markets

D. SCUSSIONS OF MARKET AND TRADE CONDITIONS

FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES • MARKET QUOTATIONS • BUSINESS ANNOUNCEMENTS

Welding Outfits in Great Demand

**Necessity for Conserving Old Material
Has Thrown Increased Duties
on Welding Equipment**

Manufacturers report that the demand for welding apparatus is increasing steadily. This is most noticeable in equipment for shop use and for use in repairing tracks and lines. The demand for bonding equipment has remained steady, although there is very little new construction of tracks, lines or equipment taking place, outside of roads which are used by the government. The inability of roads to get the necessary rails for renewals has led to the rebonding of old sections of track and to the filling in of cupped rails so that they may be continued in service. In addition to the shortage of rails, roads have been hindered in their maintenance by the shortage of men to carry on the work and welding outfits have helped to relieve this condition somewhat.

The inability of roads to get the necessary repair and renewal parts to maintain their equipment and the impossibility of obtaining iron and steel in sufficient quantities to enable them to make new parts, together with the remarkable results that were accomplished in the welding repairs to the enemy merchant ships taken over by our government has brought welding into prominence. The chief hope that railways will be able to keep the cost of repairs within reasonable limits and maintain the equipment in satisfactory operating condition lies in the extended use of labor-saving machinery and machines for facilitating repairs to damaged or excessively worn construction and equipment.

Manufacturers of welding outfits are expecting great developments and a future demand for their equipment for use in connection with the ship-building program. Up to the present time the equipment supplied has been for the usual line of welding work done in this connection and for experimental and research work which is being conducted. Indications point to a vastly broader field of usefulness for welding outfits in ship construction as soon as the safety and durability of the new methods of construction have been properly tested and the various types of apparatus necessary have been developed. The rivetless ship is one of the developments eagerly looked forward to.

During the past three years, very few new types or sizes of welding apparatus have been developed, but the general

tendency seems to lean toward greater simplicity, reliability and economy in arrangement and toward a lighter construction.

Priority certificates for iron and steel have had some effect on the supply of material used for welding, but up to the present most manufacturers have had sufficient reserve stock so that this influence has been felt but slightly. The increased attention being given by government officials to the urgent need of electric railway properties, it is believed, will result in making it easier for roads to obtain material for repairs and renewals.

Prices of complete welding equipments have advanced from 15 to 40 per cent, and prices of welding material from 50 to 100 per cent. Manufacturers report that most of the advance in the price for equipment is due to the increased cost of labor and the increase in freight rates, as up to the present time their reserve stock of material and of spare parts has not been exhausted, so they have not had to pay the increased cost for material and added expense for transportation of raw material. One manufacturer reports welding steel as having advanced from 6 to 11 cents in the past three years and carbons from 7 to 12 cents.

Most manufacturers of welding equipment report that deliveries can be made in a very short time after the receipt of order, where the apparatus used is standard. The longest deliveries are four months for the larger sizes of complete equipment, and most manufacturers give deliveries of less than one month for the smaller sizes. Welding material is being shipped 48 hours after the receipt of orders.

Mica Insulation Made in Sweden

It is reported that a factory for the manufacture of electric insulating material from mica has just been started in Gothenburg (Sweden) by a concern that has its own mines and is sure of a large supply of raw material. In Sweden it is hoped that the production of mica can be increased at home until there is enough native product to supply the entire needs of the country.

While it is stated that in all probability many of the new industries which have been started there as a result of the war will disappear when peace comes, some will continue, and it is thought the period of reconstruction following the war will create a great demand for all products used in the electrical field and result in a large increase in trade if factories are established to handle it.

Fuel Administration Issues Warning

**Rigid Economy Is Necessary to Aid in
Conservation and to Help Avert
Shortage**

In a recent bulletin the Fuel Administration states that the demand for fuel on the part of the war-making branches of the Government and the war industries is growing tremendously. Every increase in the war-making efficiency of the Nation is forcing a corresponding increase in the fuel demand. Estimates of the coal consumption for the year, which were judged high in April, are now proving inadequate.

It becomes increasingly apparent that despite the phenomenal increase in the rate of production at the mines the strictest fuel economy must be enforced if the country is to escape a serious coal shortage next winter. Every means of coal conservation must be observed, and every wasteful and unnecessary use of coal must be eliminated.

NEEDS OF NEW PLANTS

Almost daily applications are coming to the United States Fuel Administration from war industries for allotments of coal in addition to those made at the beginning of the coal year. Some are from new plants authorized by the War Industries Board, not known to the Fuel Administration at the beginning of the year. The requirements for these plants are in addition to the original allotments. Other demands are from plants already on the preferred list of war industries, for increased allowances because of enlargements and extensions to original plants made since the Fuel Administration compiled its estimates of consumption.

The increased demand for coal for the Navy reached almost 100 per cent in July. Whereas 3,500,000 tons was allotted to the Navy in April, the requirements by the middle of July had reached a basis of 6,000,000 tons. By the end of the calendar year 1919 it is estimated that approximately 8,000,000 tons will be required to cover these demands.

SHIPPING BOARD INCREASE

With the launching of new ships, the requirements of the Shipping Board have likewise grown beyond all expectation. When the annual allotment was made, April 1, 10,000,000 tons was assigned for the purposes of the Shipping Board. The actual requirements as demonstrated by experience, and as a consequence of the phenomenal re-

sults being achieved by the Shipping Board, now place the figure at 13,000,000 tons.

So also coal for bunkering purposes, at first estimated at 13,500,000, has grown in demand until present calculations call for 21,000,000 tons.

New industries not in operation at the beginning of the coal year are now running full tilt or are about to start. From these come demands for coal of consequential proportions.

OLD PLANTS INCREASE DEMANDS

Aside from the increased requirements here shown, originating from new or enlarged plants, many old plants, rated at the beginning of the coal year for marked increases of allowance over the consumption of 1917, are now demanding still more coal. Practically all the steel plants and furnaces are running twenty-four hours per day. There are no suspensions of operations save for repairs and overhauling of plants. In some instances the yearly coal requirements were underestimated. In many others enlarged production, under increased efficiency, has created a demand for additional coal. Invariably, increased steel production calls for increased coal production, demanding about five tons of coal for each ton of steel produced.

In a report on coal production dated Aug. 17, the United States Geological Survey states that the production of bituminous coal during the week of Aug. 10 decreased 278,000 net tons or 2.2 per cent, and recorded the fourth successive week of decreased output. The decrease in production during this period was equivalent to 1,000,000 net tons or 7.6 per cent below the record week of July 13, when production reached 13,286,000 net tons, and makes necessary an output of 14,500,000 net tons during the balance of the summer months to make up the deficit for the coal year to date.

The output during the week of Aug. 10 (including lignite and coal coked) is estimated at 12,274,000 net tons as against 12,552,000 net tons during the week of Aug. 3 and 10,636,000 net tons during the current week of 1917. The average production per working day during the week of Aug. 10 is estimated at 2,046,000 net tons as compared with 2,092,000 net tons during the week preceding and 1,773,000 net tons during the week of Aug. 10, 1917. The daily average during the current week fell 54,000 net tons or 2.6 per cent behind the daily summer requirements established by the U. S. Fuel Administration.

GENERAL DECREASE IN SHIPMENTS

Shipments during the past week decreased from all districts with exception of southwest Virginia, Alabama and the district including Illinois, Indiana and western Kentucky. The increase from Southwest Virginia amounted to 24.3 per cent, from Alabama 11.4 per cent and from Illinois, Indiana and western Kentucky 2.2 per cent.

Carbon Brush Market Remains Active

Deliveries Are Prompt and the Advance in Prices Has Been Relatively Small

The carbon brush market is always active, as when motors and generators are once installed it is necessary to provide brushes or else stop operation. Manufacturers report that in the traction field the demand is about the same as it was a year ago. Outside of this field the demand has increased considerably.

No difficulty has been experienced so far in obtaining sufficient raw material to enable the manufacturers to anticipate their requirements and also to keep an ample stock of standard sizes.

Advances in prices have been governed to a large extent by the reserve stock which manufacturers had previous to the present stringent conditions. Prices of brushes are also commonly made on a quantity basis, so that the number ordered by any road affects the prices quoted. One manufacturer reports that an advance of 10 per cent was made a year ago and no further increase has since been necessary. Another reports an advance of 25 per cent for last November with no further advance. Still another reports that a small advance was made last January, another increase of 10 per cent was made last July and still another 10 per cent increase will be necessary next month.

Deliveries are being made very promptly, orders for most standard sizes being filled from stock as soon as the order is received. Where sizes can be cut from those in stock these are shipped in about ten days, and when it is necessary to have the brushes made up these take from three to four weeks.

Catalogs Wanted

W. R. Wood, acting assistant general superintendent of shops and rolling stock, officininos da Cia Light and Power, Boulevard de Sao Christavao 91, Rio de Janeiro, Brazil, wishes to receive catalogs and literature pertaining to material for a street railway and a light and power company.

Seattle Car Prospects

Mayor Ole Hanson, Seattle, has approved the ordinance passed by the Council appropriating \$217,000 out of the city railway fund for the purchase of street cars in Minneapolis. Mayor Hanson has also made application to A. Merritt Taylor, director of the government transportation and housing division, for sufficient funds to enable the city to purchase necessary equipment for the municipal street railway. His telegram is as follows:

"I find on my return to Seattle that the city can secure twenty-five first-class street cars from St. Paul and six more from St. Louis, price \$270,000 f.o.b. Seattle. Terminals for elevated

will cost about \$80,000 more. Our only way of obtaining money is for City Council to vote utility bonds which have to be sold at 6 per cent and at par. We might not be able to do this at once. In any event it would delay matters too long. The city of Seattle needs transportation more than ever. Could you arrange to loan the city railway fund \$300,000 on our bonds, payable in five equal installments after the war? Security will be ample, as the bonds will be first lien on our elevated and on those cars."

Rolling Stock

Puget Sound Traction, Light & Power Company, Seattle, Wash., some months ago purchased twenty-five one-man cars for the Seattle division, built six and has fifteen more under order, making a total of forty-six of this type of car. They are now being put into supplemental service on various lines, and this service will be added to as rapidly as operators can be secured and trained. On Capitol Hill line one large car has been taken off and five of the safety cars put on, increasing service on that route 89 per cent.

San Francisco-Oakland Terminal Railways, Oakland, Cal., has been authorized by the Railroad Commission of California, in connection with a fare decision noted elsewhere in this issue, to spend \$1,181,979 for improvements. This is a reduction from the amount asked for by the company, but it includes provision for twenty-five one-man cars to cost \$162,500, twenty-five new center-entrance cars for main traffic lines to cost \$275,000, ten trail cars for main traffic lines to cost \$55,000, four dump cars to cost \$8,712 and one electric locomotive to cost \$15,000, the total of rolling stock expenditures being \$516,212.

Trade Notes

Arthur Power-Saving Recorder Company, New Haven, Conn., announces that it has received orders within the past few days for more than 500 recorders. The complete equipment of several new properties is included in the above.

The New Process Specialty Company, Milwaukee, Wis., has moved from the Enterprise Building to its new factory at 230-232 Hanover Street. This move was necessitated to provide greatly increased facilities for the manufacture of high-grade jigs, dies, gages, tools and special machinery.

Holland Trolley Supply Company, Cleveland, Ohio, announced the appointment of Arthur C. Sullivan as sales manager. Mr. Sullivan formerly was connected with the sales department of the Hensley Trolley & Manufacturing Company, and was more recently with

the Chicago office of the Hegeman-Castle Corporation.

Automatic Reclosing Circuit Breaker Company, Columbus, Ohio, announces the appointment of C. M. Hickie as sales manager of the company. For the past two years Mr. Hickie has been connected with the Pittsburgh sales office of Cutler-Hammer Manufacturing Company. Previous to that time he was engaged in practical and technical work, which has given him excellent preparation for his new duties in promoting the use of automatic protective devices for d.c. equipment of railway substations.

Chicago (Ill.) Pneumatic Tool Company announces that the contract has been let and work started on the erection of an up-to-date addition to its Cleveland plant, which is planned to double the present output. It is expected that work will be completed on the building itself about Nov. 1. The necessary equipment has been ordered and it is believed will be delivered and ready for installation by the time the building is completed, so that shortly thereafter the additional production contemplated will be available.

C. A. Bird has been placed in charge of the new Pittsburgh office of the General Devices & Fittings Company, Chicago. This office is at 1303 Arrott Building. Mr. Bird has done much research work in the line of high-tension phenomena and has prepared many papers on conductor calculations and allied engineering subjects. He was formerly one of the district engineers of this company's Cleveland office, and

while there had charge of Pittsburgh district work. Increasing demand for engineering service made it necessary to station Mr. Bird in Pittsburgh with a suitable staff of assistants.

E. P. Dillon, manager of the power division, New York office of the Westinghouse Electric & Manufacturing Company, has resigned to become general manager of the Research Corporation of New York. Mr. Dillon joined the Westinghouse Company in 1909, having been previously connected with various mining and electrical companies in Colorado. In 1917 he was transferred to the New York office as manager of the railway and power division. For several years he was assistant to manager of the railway and lighting department at East Pittsburgh, being in charge of power house and apparatus work. He was transferred to the New York office as manager of the railway and power divisions in 1917.

New Advertising Literature

W. N. Matthews & Brother, St. Louis, Mo.: Additions to catalog-handbook No. 9 are now available.

Ross Heater & Manufacturing Company, Buffalo, N. Y.: A circular describing and illustrating expansion joints.

Walter A. Zelnicker Supply Company, St. Louis, Mo.: Bulletin No. 246, devoted largely to tanks, both with and without towers.

Ross Heater & Manufacturing Company, Inc., Buffalo, N. Y.: Circular describing and illustrating surface condensers, multi-head water heaters and expansion joints, etc.

Electric Hoist Manufacturers' Association: Folder on electric hoist controllers designed to explain in non-technical language the functions of a controller on an electric hoist.

Crouse-Hinds Company, Syracuse, N. Y.: A reprint of a paper entitled "Headlights for Electric Traction Service," read by K. W. Mackall before the Central Electric Railway Association.

Cutler-Hammer Manufacturing Company, Milwaukee, Wis.: Booklet A on brakes for use with elevators and hoists where the supply is alternating current, together with dimensions of equipment.

General Electric Company, Schenectady, N. Y.: Bulletin on Type-H circular coil form transformers, oil-insulated, self-cooled or water-cooled. Covers transformers of medium size and moderate voltages.

John F. Godfrey, Elkhart, Ind.: Circular describing standard installations of the Godfrey coal conveyor. Emphasis is laid on the fact that power plants can greatly facilitate continuous operation by storing their coal now.

M. L. Oberdorfer Brau Company, Syracuse, N. Y.: Circular illustrating and describing bronze geared pumps. Their adaptability, construction, testing, sizes carried in stock, capacity, table in dimensions and ratings are shown in this bulletin.

NEW YORK METAL MARKET PRICES

	Aug. 14	Aug. 21
Copper, ingots, cents per lb.	26	26
Copper wire base, cents per lb.	29 25	29 25
Lead, cents per lb.	8 05	8 05
Nickel, cents per lb.	40	40
Spelter, cents per lb.	8 90 to 9 00	9 12½
Tin, Chinese, cents per lb.	90 to 90 5	90 to 90 5
Aluminum, 98 to 99 per cent., cents per lb.	133 00	133 00

* No Straits offering. † Government price in 50-ton lots or more, f. o. b. plant.

OLD METAL PRICES—NEW YORK

	Aug. 14	Aug. 21
Heavy copper, cents per lb.	23 50 to 24 50	24 00
Light copper, cents per lb.	20 to 21 50	20 50
Red brass, cents per lb.	21 to 22	21 to 22
Yellow brass, cents per lb.	15 to 15 50	15 to 14½
Lead, heavy, cents per lb.	7 12½ to 7 50	7 00
Zinc, cents per lb.	5½ to 5½	6 00
Steel car axle, Chicago, per net ton	\$41 52	\$41 52
Old car wheels, Chicago, per gross ton	\$29 00	\$29 00
Steel rails (scraps), Chicago, per gross ton	\$34 00	\$34 00
Steel rails (relaying), Chicago, gross ton	\$60 00	\$60 00
Machine shop turnings, Chicago, net ton	\$16 25	\$16 25

ELECTRIC RAILWAY MATERIAL PRICES

	Aug. 14	Aug. 21
Rubber-covered wire base, New York, cents per lb.	50 to 52	50 to 52
Weatherproof wire (100 lb. lots), cents per lb., New York	32 40	52 40
Weatherproof wire (100 lb. lots), cents per lb., Chicago	33 00 to 37 72	33 00 to 37 72
T rails (A. R. C. E. standard), per gross ton	\$70 00 to \$80 00	\$70 00 to \$80 00
T rails (A. R. C. E. standard), 100 to 300 ton lots, per gross ton	\$67 50	\$67 50
T rails (A. R. C. E. standard), 500 ton lots, per gross ton	\$62 50	\$62 50
T rail, high (hangar), cents per lb.	4½	4½
Flats, rdgs (grooved), cents per lb.	4½	4½
Wire nails, Pittsburgh base, cents per lb.	4½	4½
Ballroad spikes, drive, Pittsburgh base, cents per lb.	4½	4½
Railroad spikes, screw, Pittsburgh base, cents per lb.	8	8
Tin plates (flat type), cents per lb.	9½	9½
Tin plates (barrel type), cents per lb.	9½	9½
Tin rods, Pittsburgh base, cents per lb.	7	7
Flah plates, cents per lb.	9½	9½
Angle plates, cents per lb.	9½	9½
Angle bars, cents per lb.	9½	9½
Nail bolts and nuts, Pittsburgh base, cents per lb.	4 90	4 90
Steel bars, Pittsburgh, cents per lb.	5	5
Sheet iron, black (24 gage), Pittsburgh, cents per lb.	4 90	4 90
Sheet iron, galvanized (24 gage), Pittsburgh, cents per lb.	5 80	5 80
Galvanized barbed wire, Pittsburgh, cents per lb.	4 35	4 35

	Aug. 14	Aug. 21
Galvanized wire, ordinary, Pittsburgh, cents per lb.	3.95	3.95
Car window glass (single strength), first three brackets, A quality, New York, discount ...	80%	80%
Car window glass (single strength, first three brackets, B quality), New York, discount ...	80%	80%
Car window glass (double strength, all sizes AA quality), New York discount ...	82 & 3%	82 & 3%
Waste, wool (according to grade), cents per lb.	11½ to 22	11½ to 22
Waste cotton (100 lb. bale), cents per lb.	13 to 13½	13 to 13½
Asphalt, hot (150 tons minimum), per ton delivered	\$38 50	\$38 50
Asphalt, cold (150 tons minimum, pkgs. weighed in, F. O. B. plant, Maurer, N. J.), per ton	\$42 50	\$42 50
Asphalt filler, per ton	\$45 00	\$45 00
Cement (carload lots), New York, per bbl.	\$3 20	\$3 20
Cement (carload lots), Chicago, per bbl.	\$3 34	\$3 34
Cement (carload lots), Seattle, per bbl.	\$3 68	\$3 68
Linseed oil (raw, 5 bbl. lots), New York, per gal.	\$1 86	\$1 86
Linseed oil (boiled 5 bbl. lots), New York, per gal.	\$1 88	\$1 88
White lead (100 lb. keg), New York, cents per lb.	10½	10½
Turpentine (bbl. lots), New York, cents per gal.	63	63

* Government price. † These prices are f. o. b. works, with boxing charges extra.



The PEACOCK

In Daily Use on Many Austin Cars

There must be a sound reason for the answer of so many master mechanics to the question:

"Any maintenance troubles with your Peacock Brakes?"

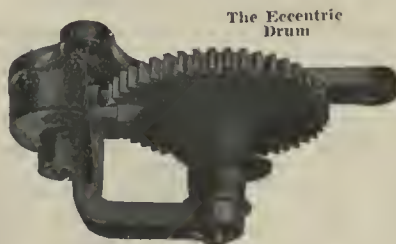
When they reply:

"What do you mean by maintenance troubles? All we know

is that the Peacock Brake is doing all that is expected of it without bothering the shop."

And that's how it is at Austin, where there are plenty of Peacocks of vertical wheel type in regular use. The Peacock is the kind of brake to specify!

National Brake Co.
Buffalo, N. Y.



The Eccentric Drum

Bankers and Engineers

Ford, Bacon & Davis,
Engineers.

115 BROADWAY
New Orleans NEW YORK San Francisco

THE J. G. WHITE COMPANIES

ENGINEERS
FINANCIERS



CONTRACTORS
OPERATORS

43 EXCHANGE PLACE NEW YORK
LONDON CHICAGO



STONE & WEBSTER

Industrial Plants and Buildings, Steam Power Stations,
Water Power Developments, Substations, Gas Plants,
Transmission Lines, Electric and Steam Railroad Work.
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ENGINEERING CO.
ENGINEERS

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First National
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REPORTS • DESIGNS • CONSTRUCTION • MANAGEMENT
HYDRO-ELECTRIC DEVELOPMENTS

RAILWAY, LIGHT AND POWER PROPERTIES
CHICAGO NEW YORK SAN FRANCISCO

H. M. Byllesby & Company, Inc.

NEW YORK CHICAGO TACOMA
Trinity Bldg. No. 208 So. La Salle St. Washington

Purchase, Finance, Construct and Operate Electric Light,
Gas, Street Railway and Water Power Properties.
Examination and reports. Utility Securities Bought and Sold.

THE ARNOLD COMPANY

ENGINEERS—CONSTRUCTORS
ELECTRICAL—CIVIL—MECHANICAL

108 SOUTH LA SALLE STREET
CHICAGO

JOHN A. BEELER

OPERATING AND RATE INVESTIGATIONS
TRAFFIC SURVEYS AND SCHEDULES
52. ELECTRIC RAILWAY MANAGEMENT 343
VANDERBILT SUPERVISION OF CONSTRUCTION District Bldg.
AVE. ENGINEERING Washington,
NEW YORK APPRAISALS D. C.

ALBERT S. RICHEY
ELECTRIC RAILWAY ENGINEER
WORCESTER POLYTECHNIC INSTITUTE
WORCESTER, MASSACHUSETTS

A. L. DRUM & COMPANY
CONSULTING AND CONSTRUCTING ENGINEERS

VALUATIONS AND FINANCIAL REPORTS
CONSTRUCTION AND MANAGEMENT
OF ELECTRIC RAILWAYS

76 West Monroe St. CHICAGO, ILL.

REPUBLIC ENGINEERS INC.

CONSULTING AND CONSTRUCTING ENGINEERS

Valuations Reports Investigations
Designs Construction Management

60 BROADWAY, NEW YORK

CLEVELAND, OHIO
Illuminating Bldg.

YOUNGSTOWN, OHIO
Mahoning Bank Bldg.

Sloan, Huddle, Feustel & Freeman
Consulting Engineers

Analytical Studies of financial and operating conditions,
appraisals and rate adjustments of electric railway and
all public utility properties.

BOSTON, 14 Kilby Street CHICAGO, Conway Bldg.

THE P. EDW. WISCH SERVICE

Suite 1710 DETECTIVES Suite 715
Park Row Bldg., New York Board of Trade Bldg., Boston

When writing the advertiser for information or prices, a men-
tion of the Electric Railway Journal would be appreciated.

ELECTRICAL TESTING LABORATORIES
Electrical, Photometrical and
Mechanical Testing.

80th Street and East End Ave., New York, N. Y.

Scofield Engineering Co. Consulting Engineers
POWER STATIONS PHILADELPHIA, PA.
HYDRAULIC DEVELOPMENTS GAS WORKS
ELECTRIC RAILWAYS

AMERICAN BRIDGE COMPANY

HUDSON TERMINAL-30 CHURCH STREET, NEW YORK

*Manufacturers of Steel Structures of all classes
particularly BRIDGES AND BUILDINGS*



Transmission Towers at Birmingham,
Alabama, Alabama Power Company.

SALES OFFICES

NEW YORK, N. Y., 30 Church Street	St. Louis, Mo., Third Nat'l Bank Bldg.
Philadelphia, Pa., Widener Building	Denver, Colo., First Nat'l Bank Building
Boston, Mass., John Hancock Bldg.	Salt Lake City, Utah, Walker Bank Bldg.
Baltimore, Md., Continental Trust Bldg.	Duluth, Minn., Wolvin Building
PITTSBURGH, PA., Frick Building	Minneapolis, Minn., 7th Ave & 2nd St. S.E.
Buffalo, N. Y., Marine National Bank	
Cincinnati, Ohio, Union Trust Building	Pacific Coast Representative:
Atlanta, Ga., Candler Building	U.S. Steel Products Co. Pacific Coast Dept.
Cleveland, Ohio, Guardian Building	SAN FRANCISCO, CAL., Rialto Building
Detroit, Mich., Beecher Ave. & M. C. R. R.	Portland, Ore., Selling Building
CHICAGO, ILL., 208 South La Salle St.	Seattle, Wash., 4th Ave. So. Cor. Conn. St.

Export Representative:

United States Steel Products Co., 30 Church St., N. Y.



THE Lincoln Bonding Machine is a traveling repair shop. Under present conditions worn and broken parts have to be used until new parts can be received.

The quickest and simplest way is by the use of a Lincoln Bonding Machine.

Any and all kinds of metallic and carbon welding made easy.

The Lincoln Bonding Machine is the lightest and most efficient machine today.

THE LINCOLN BONDING CO.
636 Huron Road, Cleveland, Ohio

Agents: Boston, Charles N. Wood Co. New York, Atlantic Welding Co. Philadelphia, Railway Track-Work Co. Pittsburgh, Electrical Engineering & Manufacturing Co. Chicago, Holden & White, Inc. St. Louis, W. L. Rose Equip. Co. Milwaukee, W. C. Burdick. Los Angeles, Wigmore, Hall & Co. Chattanooga, Tenn., Chattanooga Armature Works. Canada, Lyman Tube & Supply Co., Ltd., Montreal, Toronto, Winnipeg.



This is the bond that when welded to your rail joint shows a saving of 25-35 cents per bond. We prove this saving over any other method.

The Annual Convention

which was to have been held by the American Electric Railway Association at Atlantic City has been abandoned in favor of a meeting to be held in

New York City

The date has not yet been fixed, but will probably be that originally set for the convention; that is, during the second week of October. This change gives added importance to the Electric Railway Journal's

Annual Convention Issue and Annual Report Issue

WHILE the change in program will to a degree affect the attendance, the importance of the event is heightened.

The most important electric railway executives will attend the New York meeting. Their deliberations and decisions will be of momentous importance.

Vital questions face the industry. The New York meeting will settle many of them.

Naturally, electric railway men everywhere have their attention focused on the meeting. In that connection they will as in past years expect, welcome, read, file and repeatedly refer to the Journal's Annual Convention Issue because it will bring the industry the most thorough, complete and illuminating series of articles on many of the questions which the New York meeting will decide.

It is data of the kind which this issue will contain that will help toward momentous decisions at the meeting.

As in past years, this issue will be mechanically on a par with its editorial excellence and advertising value.

The Report Issue

will bring to a waiting field the first and most nearly complete news of what happened at the meeting. Naturally, therefore, this issue ranks in importance second only to the Convention Issue of the Electric Railway Journal.

The Circulation of Both Issues

will be all-inclusive. American electric railway buying power will be saturated practically 100%.

Advertisers

are urged to send space reservations immediately. Regular display advertising rates apply. No increase in rates.

ELECTRIC RAILWAY JOURNAL

Member Audit Bureau of Circulations

10th AVENUE AT 36th STREET, NEW YORK



Here is a Demonstration

The mechanical tie shown in this illustration was modeled in concrete for open track use.



It was placed in the tracks of the Dayton, Springfield & Xenia Southern Railway at a point where it would be subjected to the most severe use. Heavy cars at high speed have hammered this tie for **Six Years**. Its condition shows plainly—it's as good as when it was installed.



The 6-in. steel I-beam, shown here, has been in use for **Five Years** under a cross-over near a railroad crossing, where all cars run at reduced speed. It is merely **one** of a number similarly dented and hammered.

Just Study the Pictures

Then write us for further details.

THE DAYTON MECHANICAL TIE CO.

201 Third Street Arcade

DAYTON, OHIO





Thousands of Columbia Trolley Poles Ready for Immediate Shipment

For 1½-inch and 2-inch Base Harps
and for lengths of 11-feet to 15-feet.



Columbia-Made Trolley Poles are Made Right

Below are some Columbia-made specialties conveniently listed:

Columbia Machine Works & Malleable Iron Co.

Atlantic Ave. and Chestnut St.

Brooklyn, N. Y.

TOOLS

Armature and Axle Straighteners
Armature shaft straighteners
Armature buggies and stands
Babbitting molds
Banding and heading machines
Car hoists
Car replacers
Coil taping machines for armature leads
Coil winding machines
Pinion pullers
Pit jacks
Signal or target switches
Tension stands

W. R. Kerschner Co., Inc., N. Y.
Holden & White, Inc., Chicago
F. F. Bodler, San Francisco
Railway & Power Eng. Corp., Ltd., Toronto, Ont.



CAR EQUIPMENT

Armature and Axle Bearings
Armature and field coils
Bearings (Axle and Armature)
Brush-holders and brush-holder springs
Brake, door and other handles
Brake forgings, riggings, etc.
Car trimmings
Commutators
Controller handles
Forgings of all kinds
Gear cases (steel or malleable iron)
Grid resistors
Third-rail shoe beams and accessories
Trolley poles (steel) and wheels

Collier Service at El Paso

THIS card was taken from a Collier-carded car at El Paso, Texas.

It is significant as testimony that Collier Service is *selective* in its choice of advertisers and of what they advertise.

Aside from the question of the advertiser's reliability, we know from long experience throughout the United States that it pays to advertise some articles by means of our cards and that it does not pay to advertise certain other articles.

Run your eye
along these cards
and note the re-
liable people, prod-
ucts and places
they recommend.

Barron G. Collier
INC. OF TEXAS

625 Mills Building
El Paso, Texas

It is knowledge like this that inspires confidence in car card advertising under the direction of Collier Service. The confidence thus earned after many years of making good has given to the railway's revenue from car card advertising the stability it enjoys today.

Barron G. Collier
INCORPORATED

Candler Building
220 West 42nd Street, New York City

ERICO

Portable Welder

For Arc Welding
and Rail Bonding

You do not need to be an expert to get good results with the Erico Arc Welding and Rail Bonding outfit. It is simple in construction, having no rotating parts, therefore no commutators or bearings.

It saves money, time and labor. A small investment, but a big asset.

Write for details.

The Electric Railway Improvement Co.
Cleveland



EFFICIENCY — RELIABILITY — SIMPLICITY

Allis-Chalmers Steam Turbines

Show sustained economy after years of operation
Units built in sizes from 200 kw. up



3200 KW., Max. 3600 R.P.M., H.P. Condensing Steam Turbine and Alternator. Unit of this size installed in the plant of the Eastern Pennsylvania Ry. Co., Palo Alto, Pa.

Allis-Chalmers Manufacturing Co.
Milwaukee, Wis.

For all Canadian Business refer to Canadian Allis-Chalmers, Ltd., Toronto, Ont., Canada

District Offices

Atlanta, Ga.
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Cleveland, Ohio
Dallas, Texas
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San Francisco, Calif.
Santiago, Chile
So. America
Seattle, Wash.
Toledo, Ohio

"STANDARD"

Steel Tires	Steel Tired Wheels
Solid Rolled Steel Wheels	
O. H. Steel and Malleable Iron Castings	
Solid Forged Gear Blanks	
Steel Forgings	Iron Forgings
Forged and Rolled Steel	
Pipe Flanges	
Ring Dies	Rings
	Roll Shells
	Steel Springs



*"The 'Standard' Brand on your material
is an assurance of eventual economy."*



STANDARD STEEL WORKS CO.

GENERAL OFFICES:

MORRIS BUILDING, PHILADELPHIA, PA.

CHICAGO
ST. LOUIS
HAVANA, CUBA
RICHMOND

SAN FRANCISCO
NEW YORK
MONTEREY, MEX.

MEXICO CITY
LONDON, ENGLAND
PARIS, FRANCE

FMB Grid Resistors

ARE MADE RIGHT AND STAY RIGHT

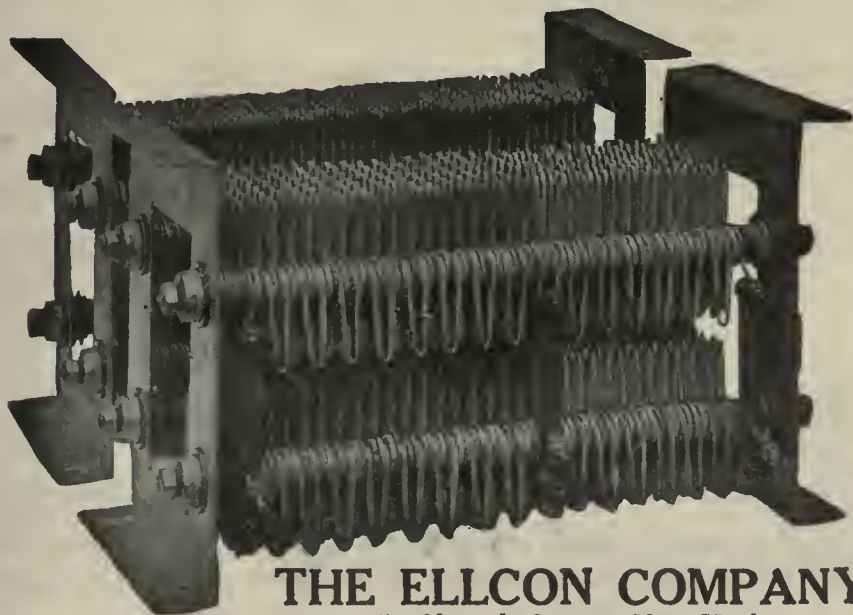
No resistors get more abuse than those under a car.

They are abused electrically by careless operation of the controller.

They are abused mechanically by exposure to dusty, muddy and stone-littered streets.

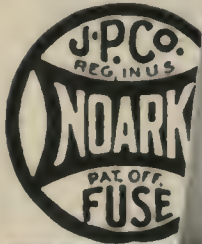
Until the arrival of E M B drawn, non-corroding grid resistors, troubles from these sources seemed unavoidable.

E M B grid resistors actually have made this part of your equipment troubleproof.



THE ELLCON COMPANY
50 Church Street, New York

Manufactured by the
Johns - Manville Co.
Hartford, Conn. H.
W. Johns - Manville
Co., Sole Selling
Agents.



NOARK

RENEWABLE FUSES

*The lug and the slot
prevent wobble*

This "Noark" Renewable Fuse offers every advantage found in others of the renewable type with every possible drawback eliminated.

Unlike any other fuse the "Noark" has knife blades that can't wobble. They are always rigid and in perfect alignment—a particularly desirable point when the fuse is used as a knife switch, and always valuable as insurance against faulty clip contact.

This is but one of the unique features—learn all about the others by ordering a supply. A trial will prove our contention that it is the best renewable fuse you can buy.



H. W. JOHNS-MANVILLE CO.
NEW YORK CITY
10 Factories—Branches in 61 Large Cities

Johns-Manville

THERE ARE THREE VALUES
FOR RAILWAY COMPANIES IN
THE SPECIFICATION and USE OF

CYPRESS

"THE WOOD ETERNAL"

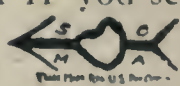
for Crossarms, Car Material,
Fencing, Station Construction
and similar railway purposes:

First, the vastly longer life of
the material itself. *All-Heart
Cypress* is pretty nearly *proof*
against the action of decay.

Second, the

SAVINGS OF LABOR COSTS IN YOUR MAIN- TENANCE WORK.

Obviously the longer the serviceable life
of the lumber you use, the less you are
going to have to repair and replace.
That of course means not merely saving
in cost of material, but also saving in
the much bigger item—*cost of labor*.

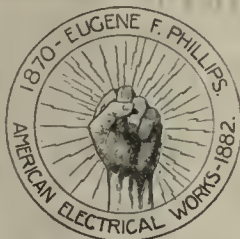
Third, when you specify Cypress you
can know *definitely* that you get what
you pay for IF you see THIS MARK:
This mark  is on the ends of
every piece of Cypress cut by
the responsible mills in this Association.
It is a guarantee that the material bear-
ing it is made, *and graded at the mill*, in
accordance with the scrupulously high
standards demanded by this Association
and the best customers of its members.

These *values* are worth *getting*. The
facts are worth *remembering*.

Our data is at your service.

SOUTHERN CYPRESS MFRS.' ASS'N

1265 Hibernia Bank Building, New Orleans, La., or
1265 Heard National Bank Building, Jacksonville, Fla.



**WEATHERPROOF WIRE
AND CABLE**
**PAPER INSULATED
UNDERGROUND CABLE**
(Single, Duplex and Three Phase)
TROLLEY WIRE
(Round, Grooved or Figure 8)
**BARE COPPER WIRES AND
CABLES**
MAGNET WIRE
(Cotton or Asbestos)

Americanite Rubber Covered Wire
Incandescent Lamp Cord

Galvanized Iron and Steel
Wire and Strand

AMERICAN ELECTRICAL WORKS

Phillipsdale, R. I.

Boston, 176 Federal; Chicago, 112 W. Adams; Cincinnati, Traction Bldg.;
New York, 233 B'way; San Francisco, 612 Howard; Seattle, 1002 1st Ave. So.

ALUMINUM COMPANY OF AMERICA PITTSBURGH, PA.

Manufacturers of Aluminum, Ingot, Sheet,
Tubing, Wire, Rod, Rivets, Moulding,
Extruded Shapes, Electrical Conductors

General Sales Office, 2400 Oliver Building, Pittsburgh, Pa.

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Cleveland.....	950 Leader-News Building
Detroit.....	1512 Ford Building
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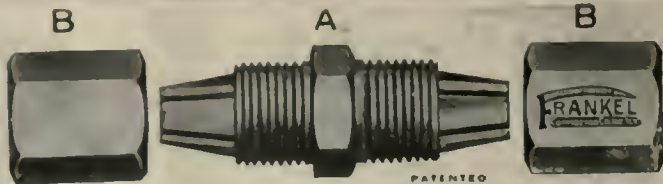
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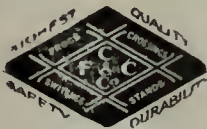
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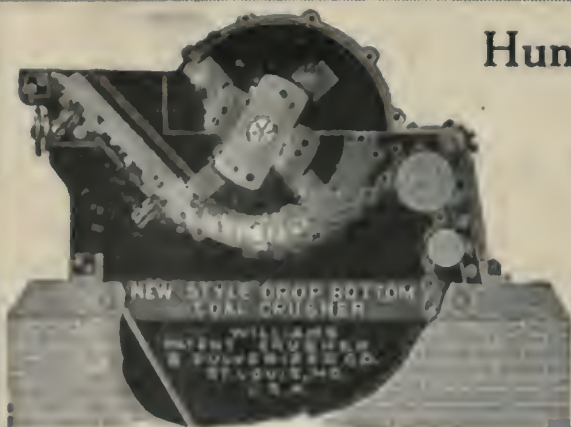
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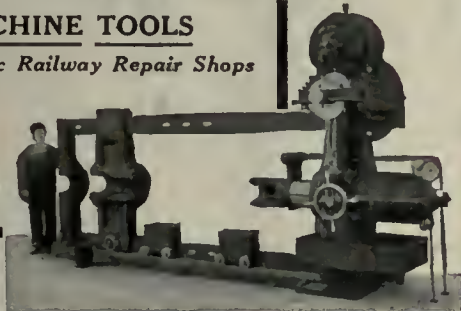
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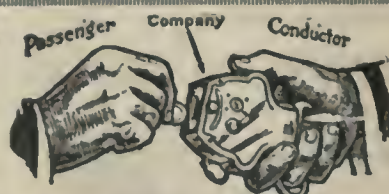
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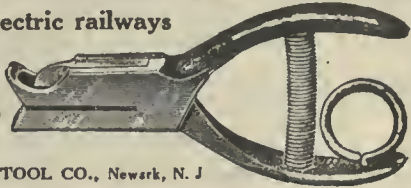
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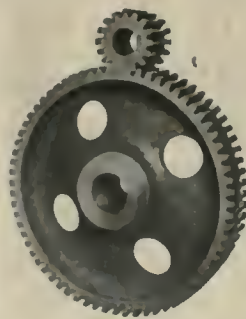
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Cp. Wd. Westinghouse 3 bearing direct current generator.

DUQUESNE
Electric & Mfg. Co.

Write, wire or 'phone our nearest office,
Pittsburgh, Pa., or 230 La Salle St.,
Chicago, Ill.

CLEVELAND ARMATURE WORKS
Cleveland, Ohio

Everything in the Line of Repairs to Electrical Machinery

Complete Armatures, New Armatures,
Rewound Armature Cores, Armature
Shafts, Armature Colls, Fields and
Commutators.

Established 22 Years.

SEARCHLIGHT SECTION

FOR SALE—Immediate Delivery

Complete Equipment of Power House

consisting of—

- 4—Heine Boilers, 250 hp. each with 115—3½-in. tubes, 18 ft. long, single drums 48 in., operating at 125 lb. pressure. Grates hand fired, 6 ft. x 8 ft. Boiler feed pump 4½ in. x 7 in. x 8 in. Service pump, 10 in. x 6 in. x 10 in.
- 2—Hamilton Corliss non-condensing engines, 28 in. x 48 in., 100 r.p.m. (one engine steel bushed to 26 in.), flywheel 18 ft., 42-in. face, belted to
- 2—400-kw. Westinghouse Generators, 375 r.p.m., belt centers 33 ft., 40 in. belt.

- 2—Generator Panels with switches, instruments and circuit breakers.

The foregoing equipment was installed in the year 1900 and is now in good running order and excellent condition. Now on the market on account of arrangement just effected for purchase of power from The Union Gas & Electric Company. Price will be made *only* on complete equipment in Power House at North Bend, Ohio (Cincinnati freight limits). Purchaser to dismantle and load on cars. Railroad switch, New York Central lines, on premises.

Also—

5 Interurban Cars

made by Jewett Car Company in the year 1900, equipped with 4 G. E. 57 motors. 2 G. E. B. 8 controllers Peckham trucks, Christensen 1 AA air brakes, 33 ft. wheels, seating capacity 44, length over all 42 ft. 6 in. Passenger compartment 16 ft. 6 in. Smoking compartment 11 ft. 0 in.

Electric heating system. Weight 25 tons. All these cars are in good operating condition and ready for immediate shipment. Price will be made on one or more of these cars f. o. b. North Bend, Cincinnati.

Address inquiries to Stanley Shaffer, Attorney for C. E. Hoooven and Edgar Stark, Receivers of

The Cincinnati, Lawrenceburg & Aurora Electric Street Railroad Company
30 Atlas Bank Building, Cincinnati, Ohio

CAR BARGAINS

OPEN and CLOSED
MOTOR and TRAIL

Write for Price and Full
Particulars to

**ELECTRIC
EQUIPMENT Co.**
601 Commonwealth Bldg Phila. Pa.

FOR SALE

3—400-kv.-a. Westinghouse, oil insulated, self-cooled, outdoor type, single phase

TRANSFORMERS

60-cycle, 25,000-volt primary, 2500-volt secondary
Delivery after July 15, 1918

Alabama City, Gadsden & Atlanta Ry. Co.
Gadsden, Ala.

FIRST Get Bulletin 237—or, Wire

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RAILS

Locomotives—Cars—Tanks
Machinery, Piling, etc.

What have you for sale?

Immediately Available

Complete equipment of
1000-kw., 600-volt, D.C.

POWER PLANT

Comprising two Cooper-Corliss
engines, 90-r.p.m., direct connected to 500-kw. Westinghouse
Generators.

WEST PENN POWER COMPANY
Pittsburgh, Pa.

AIR COMPRESSOR

Sullivan Straight Line Steam
Driven, 2-Stage, Class WB-2

Capacity, 1160 cu.ft.

Diameter, steam cylinder, 20 in.

Diameter, I.P. air cylinder, 22 in.

Diameter, H.P. air cylinder, 14 in.

Stroke, 24 in.

Total weight, 33,500 pounds.

Price, \$1500.00.

Thoroughly Overhauled and Ready
for Immediate Shipment

PS 233—Electric Railway Journal
1870 Old Colony Bldg. Chicago, Ill.

NEW EDISON STORAGE BATTERIES

Have 225 new cells A-10 Edison Nickel Steel Batteries. In fine condition. Never used. 1 8/10 volts per cell for heavy continuous work. Cannot break them down on overload. Fine for railway signaling work, electric light storage. Any purpose where reliable batteries are needed. *Will sell for less than half of cost price.* Write quick. Next to largest size made.

H. E. BUCKLEN, Receiver St. J. V. R.R. CO.

Elkhart, Indiana

SEARCHLIGHT SECTION

ELECTRIC LOCOMOTIVE

1—86-ton Electric Locomotive, rated as an 8-0-8, E-172, 4 GE 94, 600 V. It is of double 4-axle truck type, each truck being equipped with two bipolar gearless motors and furnished with box cab.

DIMENSIONS AND WEIGHTS

Length inside of knuckles,	Width over all.....	10 ft. 1 in.	Total weight	172,500 lb.
35 ft. 2 in.	Total wheel base.....	29 ft. 0 in.	Wt. on drivers.....	117,200 lb.
Length over cab.....	Rigid wheel base.....	12 ft. 0 in.	Maximum safe speed..	.60 M.P.H.
32 ft. 6 in.	Track gauge	4 ft. 8 1/4 in.	Minimum radius curvature,	150 ft.
Height over cab....				
12 ft. 1 in.				

Complete and detailed specifications will be mailed upon request.

CHESTER A. PHILLIPS & COMPANY, 970 Old Colony Bldg., Chicago, Ill.

IMMEDIATE DELIVERY can be given on the following equipment MAKE US AN OFFER

1—Open Car
Type—Open, 15 bench, double trucks
Built by Wason Mfg. Co.
Type Trucks—Wason No. 21
Type Motors—Westinghouse 12-A
Motors per car—4
Controllers—K-6
Gear Ratio—18-64
Wheels—30-in. diameter, 2 1/2-in. thread
Air Equipment—AA-1 compressor and Christensen motorman's valves
Body Overhauled—1915
Trucks Overhauled—1917
Motors Overhauled—1917
Painted—1916
Complete with trolleys, headlight resistance dasher lights.

1—Open Car
Type—Open, 15 bench, double truck
Built by—Wason Mfg. Co.
Type Trucks—Wason No. 21
Type Motors—None
Motors per car—None
Controllers—None
Gear Ratio—64 gears
Wheels—30-in. diameter, 2 1/2-in. tread
Air Equipment—AA-1 compressor and Christensen motorman's valves
Body Overhauled—1915
Trucks Overhauled—1917
Painted—1916
Trucks are not equipped with motors, but 6 West. 12 A can be supplied; also 2 extra sets of wheels and about 25 brake shoes.

1—25-ton Freight Motor
Type—Box, with still channels for center sills, attached to MCB Couplers, double truck
Built by Locomotive Car Co.
Type Trucks—E. H. Locomotive (Taylor Improved)
Type Motors—GE-67
Motors per car—4
Controllers—K-6
Gear Ratio—15-49
Wheels—4-in. tread, 33-in. diameter, FCS
Air Equipment—Westinghouse separate, straight and automatic D2A Compressor
Body Overhauled—1916
Trucks Overhauled—New 1916
Motors—In good condition
Painted—1916

Equipped throughout for handling standard freight equipment. Would make a good express car. Could be shipped in regular freight train—that is, without loading on any other car.

1—Bullock D.C. Generator, 550-volt, 455-amp., 500-r.p.m., complete with ralls, pulley, belt, field rheostat, circuit breaker and ammeter.

1—Westinghouse, 400-amp., 750-volt, circuit breaker, new.

1—Thompson, 60-cycle, 1200-amp., switchboard type, D.C., watt-hour meter.

About 1000 ft. 7-in. girder Lorain Steel Co. rolling No. 97-420 new Rail, with splice bars and flat tie rods.

CLEMONT RAILWAY & LIGHTING CO.
Claremont, N. H.

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Motor Generator Sets

25 to 60-cycle, or frequency changer, 25 to 60-cycle, 3-phase, 2300 V. on each side. Capacity 300, 500, or even 750 K.W. *Shipment wanted at once.*

Albany Southern Railroad Co.

Renasseler, N. Y.

RAILWAY EQUIPMENT WANTED

6—G. E. Controllers, either K-12, K-28 or K-35.
6—G. E. Handles for above
3—Boxes of G. E. Grids, each with 18 grids, size 8 C.G. in series.
3—Boxes of G. E. Grids, each with 3 grids, size 8 C.G. in series, and
9—Grids, size 10 C.G. in series, and
6—Grids, size 6 C.G. in series.
3—Boxes of G. E. Grids, each with 18 grids, size 6 C.G. in series.
6—G. E. 80 Motors, complete with gear cases, 17 tooth pinions. Motors for 4 1/2-in. axle bearings.

All must be in first-class operating condition. State weight, price, f.o.b. cars and shipping point.

W232—Electric Railway Journal,
501 Rialto Bldg., San Francisco, Cal.

POSITIONS VACANT

CASHIER wanted. Give full information, including salaries heretofore earned. Mobile Light & Railroad Co., Mobile, Alabama.

CHIEF Clerk to Auditor wanted. Must be familiar with Interstate Classifications, and a live wire capable of taking entire charge of Auditing Department, City and Interurban property. State age, salary required, education and experience. P-222, Elec. Ry. Journal, Chicago.

DRAFTSMAN, experienced on electrical power plant or sub-station work. Good future for men of ability. New York & Queens Electric Light & Power Co., 444 Jackson Ave., Long Island City, New York.

TRAVELLING Auditor wanted to check Freight and Ticket Agents' Accounts. State experience, age and salary expected, and give references. P-221, Elec. Ry. Journal, Chicago.

RAILWAY armature winder wanted; experienced in armature winding and repair work. Gary Street Railway Company, Gary, Indiana.

SMALL road in Illinois wants experienced master mechanic who has demonstrated his ability to maintain rolling stock efficiently. Give full information in first letter. Address P-231, Elec. Ry. Journal, Chicago.

POSITIONS WANTED

AUDITOR solicits change; thirteen years' experience in Street Railway Accounting; age 35; married; references. PW-223, Elec. Ry. Journal.

CLAIM agent, regarded as one of the ablest and most successful, one of the leading experts in accident prevention and high class transportation man, desires change. Particularly desirous of becoming attached to a property in which the accident expense is regarded as unreasonably high. Would undertake to bring about substantial reduction and can do so within a reasonably short time. Highest references. PW-217, Elec. Ry. Journal.

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7-in Girder Rails

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WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with
Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car.
Collier, Inc., Barroo G.

Air Rectifiers
Holden & White, Inc.

Alloys, Iron and Steel.
Titanium Alloy Mfg. Co.

Anchors, Guy.
Electric Service Supplies Co.
Holden & White, Inc.
Johns-Manville Co., H. W.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

Anti-Climbers
Railway Improvement Co.

Automobiles and Buses.
Brill Co., The J. G.

Axis Straighteners.
Columbia M. W. & M. I. Co.

Axles, Car Wheel.
Bemis Car Truck Co.
Brill Co., The J. G.
Carnegie Steel Co.
National Railway Appliance Co.
St. Louis Car Co.
Standard Steel Works Co.
Westinghouse Elec. & M. Co.

Babbitting Devices.
Columbia M. W. & M. I. Co.

Baders and Buttons.
Electric Service Supplies Co.
International Register Co., The

Batteries, Dry.
Johns-Manville Co., H. W.
Nichols-Lietern Co.

Batteries, Storage.
Electric Storage Battery Co.

Bearings and Bearing Metals.
Ajax Metal Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
More-Jones Brass & Metal Co.
St. Louis Car Co.
Titanium Alloy Mfg. Co.
Westinghouse Elec. & M. Co.

Bearings, Center and Roller Hubs.
Holden & White, Inc.

Bearings, Roller and Rail.
Gurney Rail-Bearing Co.
S K F Ball Bearing Co.

Bells and Gongs.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
St. Louis Car Co.

Benders, Rail.
Niles-Bement-Pond Co.
Zelnicker, Walter A., Supply Co., Inc.

Bollers.
Nabstock & Wilcox Co.

Roller Cleaning Composites.
Johns-Manville Co., H. W.

Roller Coverings.
Johns-Manville Co., H. W.

Roller Tubes.
National Tube Co.

Book Publishers.
McGraw Hill Book Co., Inc.

Road Testers.
American Steel & Wire Co.

Roadway Apparatus.
American Steel & Wire Co.
Electric Railway Improvement Co.
Electric Service Supplies Co.
Imperial Brass Mfg. Co.
Ohio Brass Co.

Rods, Rail.
American Steel & Wire Co.
Electric Railway Improvement Co.
Electric Service Supplies Co.
General Electric Co.
Johns-Manville Co., H. W.
Lincoln Bending Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

Boring Tools, Car Wheel.
Niles-Bement-Pond Co.

Brackets and Cross Arms. (See also Poles, Ties, Posts, Etc.)
American Bridge Co.
Hubbard & Co.
Lindaley Bros. Co.
Ohio Brass Co.

Brake Adjusters.
Holden & White, Inc.
Westinghouse Traction Brake Co.

Brake Shoes.
Amer. Brake Shoe & Fdry. Co.
Harbour-Stockwell Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

Brakes, Brake Systems and Brake Parts.
Allis-Chalmers Mfg. Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
General Electric Co.
Holden & White, Inc.
National Brake Co.
St. Louis Car Co.
Westinghouse Trac. B. Co.

Bridges and Holdings.
American Bridge Co.

Brooms, Track, Steel or Rattan.
Zelnicker, Walter A., Supply Co., Inc.

Brush Holders.
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eureka Co.

Brushes, Carbon.
General Electric Co.
Jeandron, W. J.
Morgan Crucible Co.
National Carbon Co.
United States Graphite Co.
Westinghouse Elec. & M. Co.

Brushes, Graphite.
United States Graphite Co.

Bunkers, Coal
American Bridge Co.

Bushings, Case Hardened & Manganoese
Bemis Car Truck Co.

Cables. (See Wires and Cables.)

Carbon Brushes. (See Brushes, Carbon.)

Car Equipment. (For Fenders, Heaters, Registers, Wheels, etc.—See those headings.)

Car Trimmings. (For Curtains, Registers, Doors, Seats, etc.—See those headings.)

Cars, Passenger, Freight, Express, etc.
American Car Co.
Brill Co., The J. G.
Kuhlman Car Co., G. C.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.
Wagon Mfg. Co.

Cars, Second Hand.
Electric Equipment Co.

Cars, Self-Propelled.
Electric Storage Battery Co.
General Electric Co.

Counting Recorders
Railway Improvement Co.

Castings, Brass, Composition or Copper.
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Columbia M. W. & M. I. Co.
Eureka Co.
More-Jones Brass & Metal Co.

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American Bridge Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Horne Mfg. Co.
St. Louis Car Co.
Standard Steel Works Co.
Union Spring & Mfg. Co.

Castings, Malleable and Brass.
Amer. Brake Shoe & Fdry. Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

Catchers and Retrievers, Trolley.
Electric Service Supplies Co.
Holden & White, Inc.
Ohio Brass Co.
Wood Co., Chas. N.

Ceiling, Car.—(See Head Lining.)

Circuit Breakers.
Automatic Reclosing Circuit Breaker Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Clamps and Connectors for Wires and Cables.
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

Cleaners and Scrapers Track.—(See also Snow-Plows, Sweepers and Brooms.)
Brill Co., The J. G.
Ohio Brass Co.

Clusters and Sockets.
General Electric Co.

Coal and Ash Handling.—(See Conveying and Hoisting Machinery.)

Coal Crushers and Pulverizers.
Williams Patent Crusher & Pulverizer Co.

Coil Banding and Winding Machines.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

Coils, Armature and Field.
Cleveland Armature Works.
Columbia M. W. & M. I. Co.
D & W Fuse Co.
General Electric Co.
Independent Lamp & Wire Co.
Westinghouse Elec. & M. Co.

Coils, Choke and Kieking.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Coin-Counting Machines.
International Register Co., The

Commutator Motors.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.
Wood Co., Chas. N.

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General Electric Co.

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Westinghouse Elec. & Mfg. Co.

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Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Trac. B. Co.

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Allis-Chalmers Mfg. Co.
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Johns-Manville Co., H. W.

Connectors, Solderless.
Frankel Connector Co.
Westinghouse Elec. & Mfg. Co.

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Electric Service Supplies Co.

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Allis-Chalmers Mfg. Co.
Columbia M. W. & M. I. Co.
General Electric Co.
Johns-Manville Co., H. W.
Westinghouse Elec. & Mfg. Co.

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General Electric Co.
Westinghouse Elec. & Mfg. Co.

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Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Conveying and Hoisting Machinery.
Americab Bridge Co.
Columbia M. W. & M. I. Co.
Green Engrs. Co.

Cord, Bell, Trolley, Register, etc.
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The
Samson Cordage Works

Cord Connectors and Couplers.
Electric Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.

Couplers, Car.
Brill Co., The J. G.
Ohio Brass Co.
Van Dorn Coupler Co.
Westinghouse Trac. B. Co.

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Allis-Chalmers Mfg. Co.
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Crosscutting. (See Wood Preservatives.)

Cross Arms. (See Brackets.)

Crossing Foundations.
International Steel Tie Co.

Crossing Signals. (See Signals, Crossing.)

Crossings, Track. (See Track, Special Work.)

Crushers, Rock.
Allis-Chalmers Mfg. Co.

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Canton Culvert & Silo Co.

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St. Louis Car Co.

Cutting Apparatus, Oxy-Acetylene.
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Milburn Co., The Alex.

Derailing Devices. (See also Track Work.)
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Destination Signs.
Columbia M. W. & M. I. Co.
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are unqualifiedly superior to any other instruments designed for the same service.

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Drills, Track.
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Ohio Brass Co.

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Arnold Co., The.
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Dram & Co., A. L.
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Sanderson & Porter.
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Engines, Steam.
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International Register Co., The
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American Steel & Wire Co.
Fage Steel & Wire Co.

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Brill Co., The J. G.
Consolidated Car Fender Co.
Electric Service Supplies Co.
Star Brass Works.

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Johns-Manville Co., H. W.
Westinghouse Elec. & Mfg. Co.

Field Cables (See Cables.)

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Johns-Manville Co., H. W.

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Brill Co., The J. G.

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Nuttall Co., R. D.

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Grinding Blocks and Wheels
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Nuttall Co., R. D.
Star Brass Works.

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Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
St. Louis Car Co.

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Gold Car Heating & Lighting Co.
Smith Heater Co., Peter.

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Ohio Brass Co.

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Standard Woven Fabric Co.
Westinghouse Elec. & M. Co.

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Holden & White, Inc.
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Insulator Pins.
Electric Service Supplies Co.
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Brill Co., The J. G.
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Brill Co., The J. G.
S K F Ball Bearing Co.

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Electrical Testing Lab's.

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Electric Service Supplies Co.
General Electric Co.
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General Electric Co.
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Lighting Regulators, Car.
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General Electric Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

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Milburn Co., The Alex.

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Columbia M. W. & M. I. Co.
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Niles-Bement-Pond Co.

Machine Work.
Columbia M. W. & M. I. Co.
Holden & White, Inc.

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Meters. (See Instruments.)
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Wood Co., Chas. N.

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Bemis Car Truck Co.
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Oxy-Acetylene. (See Cutting Apparatus, Oxy-Acetylene.)

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Johns-Manville Co., H. W.
Power Specialty Co.
Westinghouse Traction Brake Co.

Packing Rings.
Johns-Manville Co., H. W.

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Mitchell-Rand Mfg. Co.

Paints and Varnishes. (Preservative.)
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Barrett Co., The
Johns-Manville Co., H. W.

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(See Brake Adjusters.)

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Power Specialty Co.

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Ramapo Iron Works.

Switches, Track. (See Track Special Work.)

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Emergency conditions and the character of war-construction require employment of methods combining availability with speed and efficiency.

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Small illustration at right shows man Brush-treating facing surfaces of ship timbers with Carbosota

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Ohio Brass Co.
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Brill Co., The J. G.

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St. Louis Car Co.

Voltmeters. (See Instruments.)

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Systems.
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Electric Ry. Improvement Co.

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Electric Ry. Improvement Co.
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Imperial Brass Mfg. Co.
National Ry. Appliance Co.
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Wheel Guards.)

Wheel Presses. (See Machine
Tools.)

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Carnegie Steel Co.
Standard Steel Works Co.

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Nuttall Co., R. D.
Star Brass Works.

Whistles, Air.
General Electric Co.
Ohio Brass Co.
Westinghouse Traction Brake Co.

Wire Rope.
American Steel and Wire Co.
Roebbling's Sons Co., John A.

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Aluminum Co. of America.
American Elec'l Works
American Steel & Wire Co.
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D & W Fuse Co.
General Electric Co.
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Birney Safety Car taking on passengers in front of Hotel Rice, Houston, Texas. Note that the jitney at the left is empty.

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Gurney Ball Bearing Co.
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Jamestown, N. Y. 309

GURNEY



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 Northern Electric Company, Chico.
 Glendale & Montrose Railway.
 Pacific Gas & Electric Company, Sacramento.
 Southern Pacific Company, Los Angeles.
 Southern Pacific Company, Fresno.
 Southern Pacific Company, San Jose.
 Southern Pacific Company, Stockton.

Connecticut:
 Colorado:
 Florida:
 Georgia:
 Illinois:

The Connecticut Company, New Haven.
 Colorado Springs & Interurban Railway Company.
 Tampa Electric Company.
 Columbus Railroad Company.

Indiana:

Centralia Traction Company.
 East St. Louis Electric Railway Company.
 Louisville & Southern Indiana Traction Company, New Albany.
 Gary Street Railway Company.
 Terre Haute, Indianapolis & Eastern Traction Company.

Iowa:

Cedar Rapids & Marion City Railway Company.
 Keokuk Electric Company.

Maine:

Mason City & Clear Lake Railroad Company.

Massachusetts:

Bangor Railway & Electric Company.
 Boston Elevated Railway Company.
 Bay State Street Railway Company, Lowell.
 Concord, Maynard & Hudson Street Railway Company.
 Middlesex & Boston Street Railway Company.
 Brockton & Plymouth Street Railway Company.

Michigan:
 Mississippi:
 Missouri:

Ironwood & Bessemer Railway & Light Company.
 Vicksburg Light & Traction Company.
 Springfield Traction Company.
 St. Joseph Railway, Light, Heat & Power Company.
 The Kansas City Railways Company.

Nebraska:
 New Hampshire:
 New York:
 North Carolina:
 Oklahoma:

Omaha, Lincoln & Beatrice Railway Company.
 Laconia Street Railway Company.
 Peekskill Lighting & Railroad Company.
 North Carolina Public Service Company, Greensboro.
 Pittsburgh County Railway Company, McAlester.
 Oklahoma Railway Company, Oklahoma City.
 Tulsa Street Railway Company.

Ohio:
 Oregon:

The Cleveland, Southwestern & Columbus Railway Co., Elyria.
 Pacific Power & Light Company, Astoria.
 Portland Railway, Light & Power Company.

Pennsylvania:

Coatesville Trolley Company.
 Northwestern Pennsylvania Railway Company, Meadville.
 Butler Railway Company.

Rhode Island:
 Texas:

Newport & Providence Railway Company.
 Dallas Consolidated Electric Street Railway Company.
 El Paso Electric Railway Company.
 Northern Texas Traction Company, Fort Worth.
 Houston Electric Company.
 Wichita Falls Traction Company.
 Port Arthur Traction Company.

Utah:
 Washington:

Utah-Idaho Central Railroad Company, Ogden.
 Gray's Harbor Railway & Light Company, Aberdeen.
 Puget Sound Traction, Light & Power Company, Bellingham.
 Puget Sound International Railway & Power Company, Everett.
 Puget Sound Traction, Light & Power Company, Seattle.
 Tacoma Railway & Power Company.
 Seattle Municipal Street Railway.

Wisconsin:
 Nova Scotia:

Madison Railways Company.
 Cape Breton Electric Company, Limited, Sydney.

Statement will be made later of destinations of Safety Cars ordered by the following:

STONE & WEBSTER, BOSTON.
 ST. LOUIS RAIL & EQUIPMENT COMPANY, ST. LOUIS
 AMERICAN TRADING COMPANY, MEXICO CITY.

THE J. G. BRILL COMPANY
 PHILADELPHIA, PA.

AMERICAN CAR COMPANY
 ST. LOUIS, MO.

G. C. KUILLMAN CAR COMPANY
 CLEVELAND, OHIO

WASON MANUFACTURING CO.
 SPRINGFIELD, MASS.



The K-63 Controller

Less Work for the Motorman—More Room for the Passenger

The K-63 Controller is another marvelous advance in the production of light-weight, compact equipment. Although two of these controllers weigh only 270 pounds, they will handle equipments up to two 40-hp. motors on 600 volts, thus giving a large factor of safety when operating two 25-hp. motors on a light-weight car.

This controller with its light-weight cylinder and smaller fingers is more easily manipulated than the

controllers hitherto used on city cars, thus relieving the operator of an appreciable amount of fatigue.

Then, too, the addition to fare handling equipment on the front platform makes compactness exceptionally desirable, thereby securing a high rate of passenger interchange without jostling or possible injury to patrons.

So the K-63 is doubly desirable since its installation will please both the car operator and the car user.

95-3



General Electric Company

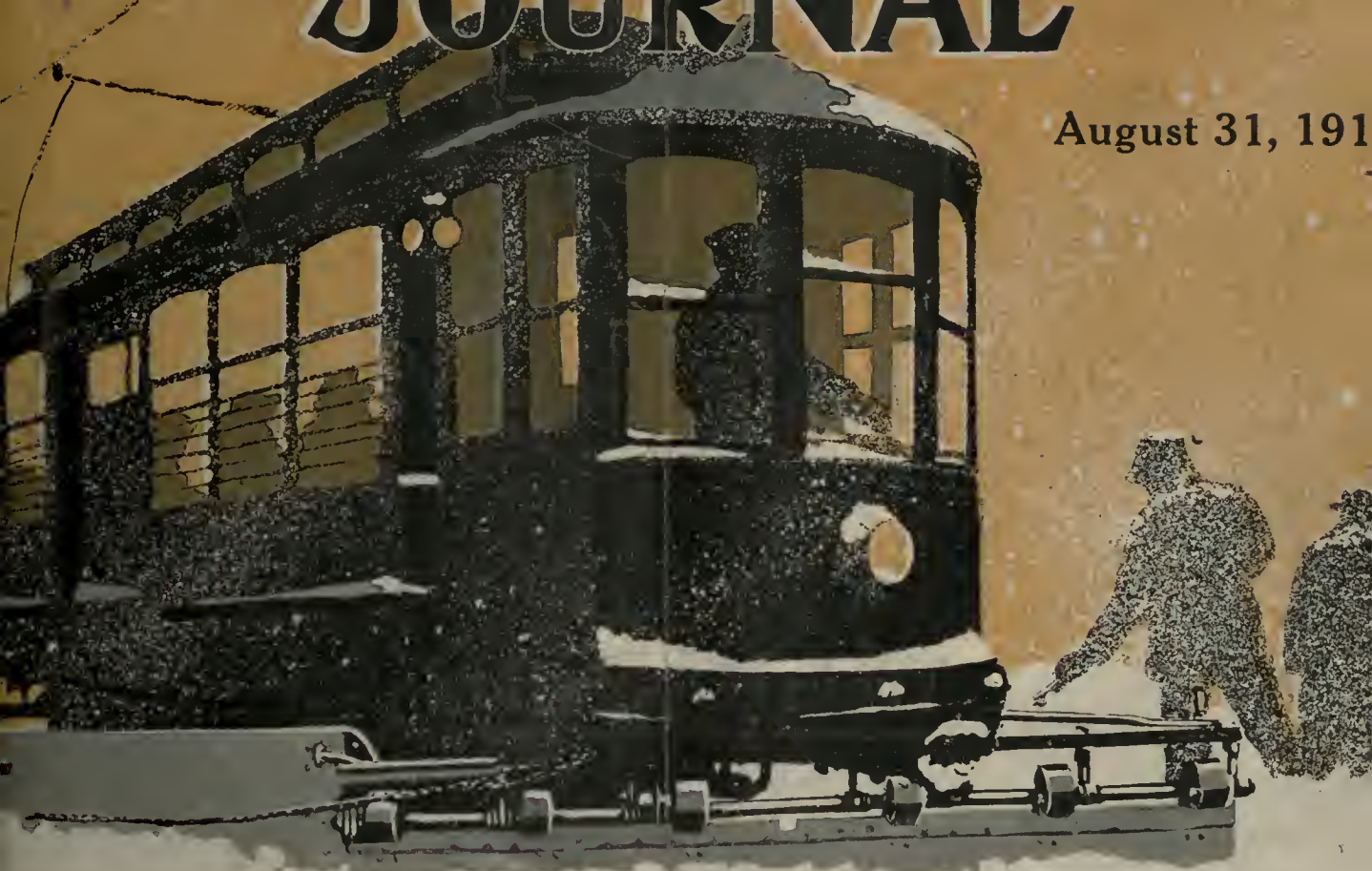


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ELECTRIC RAILWAY JOURNAL

August 31, 1911



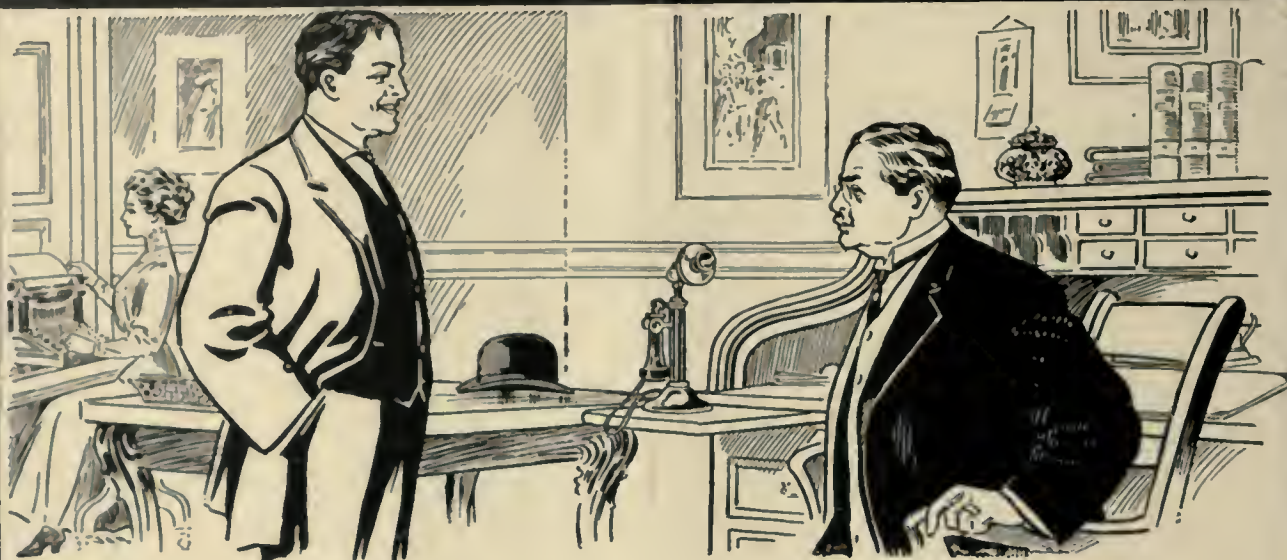
ROOT SPRING SCRAPERS



When snow comes each Root Scraper will do the work of scores of men; thus making track cleaning immune from the increasing labor shortage. By maintaining a good tractive rail they enable you to keep all your good order cars running on schedule. Clear tracks also mean a big fuel saving at the power house. In a word, Root Spring Scrapers promote economies in keeping with the spirit and needs of the times.

Due to the scarcity of snow sweeper ratton, Root Scraper No. 6 has replaced sweepers on many roads. Root Scrapers of Flange type (shown at left) are in general use on hundreds of lines. Order now and insure early delivery.

Root Spring Scraper Co., Kalamazoo, Mich.

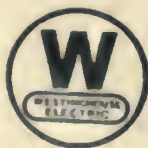


Train Operation

"JOE," said the General Manager to the Superintendent, "I was very much gratified while East last week, to learn that most of the big Eastern roads had bought Multiple-Unit Control for their new cars. You know we were criticised a few years ago, when we decided on Westinghouse H. L. Control for our city cars."

"Well," replied Joe, "It's only a question of time until they will all come to it. The place for heavy-current carrying parts is under the car. All that should be on the platform is the small, easily handled master controller and most important of all, is the ability to operate two, or more, cars in trains. It saves labor and provides better rush-hour service."

Westinghouse Electric
East Pittsburgh



& Manufacturing Co.
Pennsylvania

Electric Railway Journal

H. W. BLAKE, *Editor*

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Air Brakes for Every Service



"SAFETY" Car, Northern Texas Traction Co.,
Fort Worth, Texas, Weight, 14,000 lbs.
Semi-Automatic Brake.

We supply air brakes for all kinds of electric railway cars from the light weight, "SAFETY" car to those in heavy, multiple-unit train service.

We recommend semi-automatic schedules for single city cars, with and without occasional trailers;

automatic brakes for trains of two or three cars in city, suburban and interurban service; and universal variable-load brake, electrically controlled, for elevated and subway trains.

Train on the New York Municipal Railway. Car weight, 87,000 lbs. Electro-Pneumatic, Variable Load Brake.



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TYPE AW SWITCHBOARD INSTRUMENTS
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APPLICATION


Operation and Construction

These pages show a number of original instruments as described and illustrated in the last edition of Catalogue 3-B, just off the press.

To keep abreast of instrument development you should have this Catalogue in your files.

Westinghouse Electric & Mfg. Co.
East Pittsburgh, Pa.
Sales Offices in All Large American Cities

153



Westinghouse

Phono-Electric

Never Fears the Micrometer

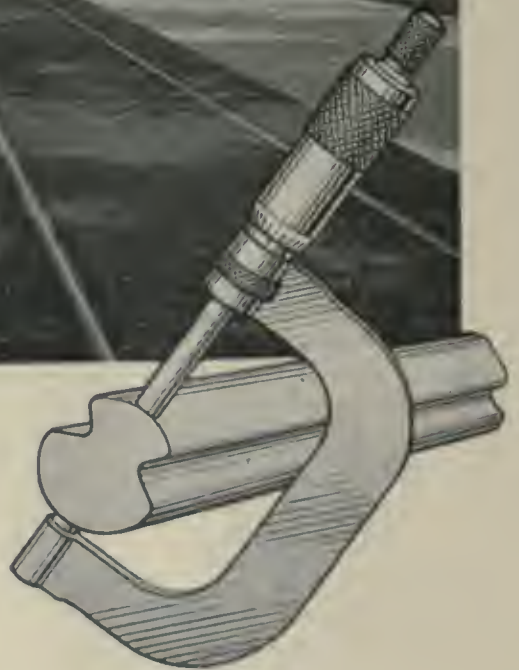


7 miles of Phono-Electric on the Esplanade Belt Line. Installed 5 years ago.

On the New Orleans Railway & Light Company lines, it is regular practice to micrometer the trolley wire every six months at three points on each span.

One man takes from nine to ten weeks to carry out this job with the accuracy demanded.

It is this attention to the important matter of longevity that has helped the New Orleans Company reach the decision that Phono-Electric Wire was a worthy standard.



Bridgeport Brass Company

Bridgeport Connecticut



PRODUCTS

Quality First



O-B Compressed Terminal Bond.



O-B Gas Weld Bond.

How "Quality First" Improves Your Operation and Cuts Your Costs

In line with our ideal of "Quality First" each manufacturing step is calculated to make O-B Rail Bonds the best possible commercial products.

This has a definite meaning for you. You can be sure that every O-B Bond is a good bond.

Good bonding improves schedules.

Good bonding reduces the number of burnt-out armatures.

Good bonding cuts coal consumption.

Good bonding relieves over-loaded power equipment.

Write for "Return Circuits and Rail Bonds." It tells how to figure the saving rebonding will effect.

THE OHIO BRASS CO., Mansfield, Ohio

New York City

Philadelphia

Pittsburgh

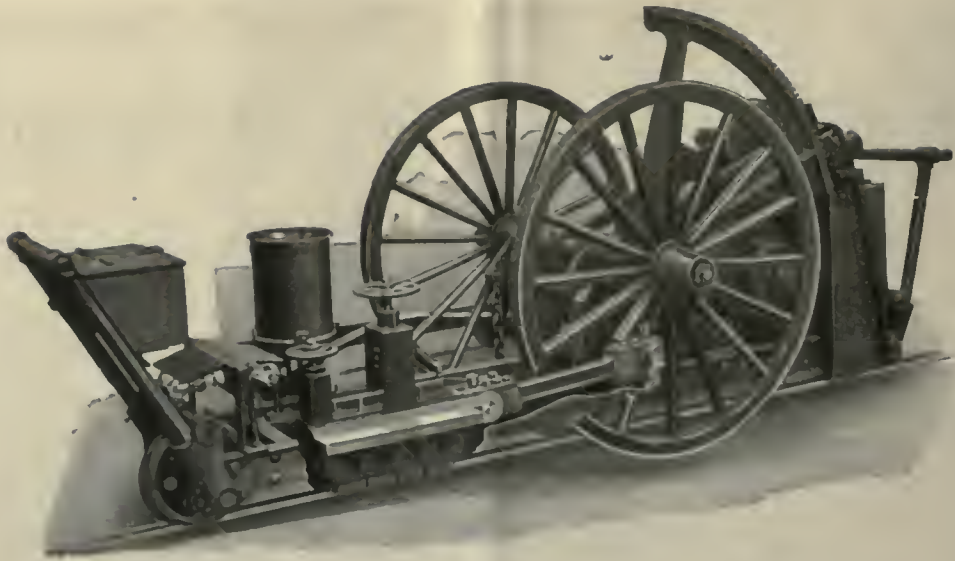
Chicago

San Francisco

Los Angeles



O-B Type J Bond.



It Saves Money in BIG Sums

The electric railway companies which have been using the

Reciprocating Track Grinder

and have definitely figured the results achieved are keenly appreciative of the fact that the savings due to this machine are *big* savings. That the savings made represent not merely an adequate return on the investment, but that they quickly repay the investment and roll up a net profit of comfortable proportions.

These quick and large savings have been especially apparent where properties have had sections of track deteriorate to such an extent that entirely new track seemed to be the only remedy.

In many such cases the Reciprocating Grinder has made the old track serviceable for years at a *fraction* of the cost of new track.

The Reciprocating Track Grinder has saved a *lot* of money for the electric railway industry.

It will save money on your lines if you give it the chance.

RAILWAY TRACK-WORK COMPANY

30th and Walnut Streets, Philadelphia

AGENTS: Holden & White, Inc., 343 S. Dearborn St., Chicago.

Concreting 1320 Ft. of Track Daily

INTERNATIONAL STEEL TWIN TIES

Make That Schedule Easy

200 cubic yards of concrete is being mixed and placed in 10 hours by a gang of twenty-five men on a number of street railway properties. With 800 cubic yards of concrete to the mile of steel twin tie track below the rail base, this gang will concrete completely 1320 ft. of track in 10 hours.

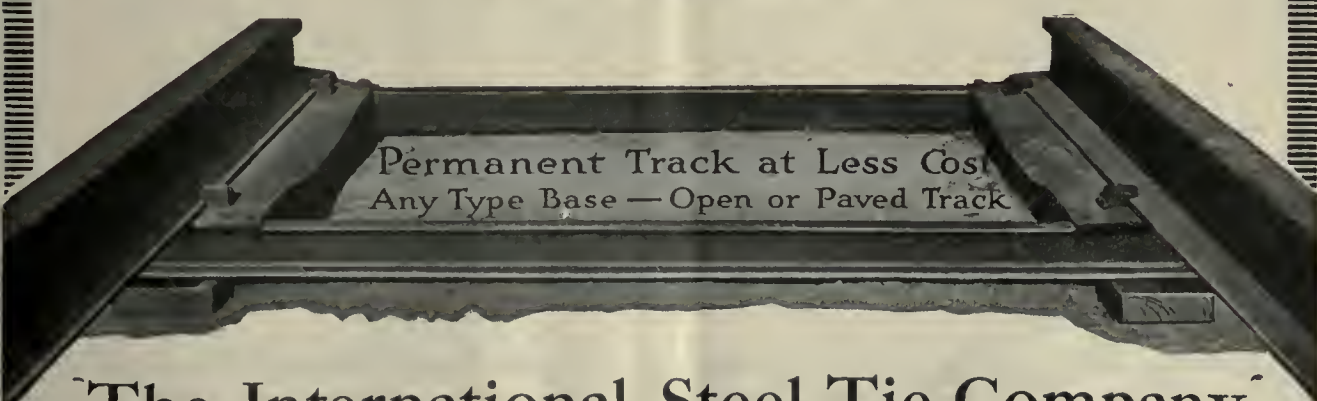
Steel twin ties in a seven-foot trench and with seven inches of concrete in bearing below the tie plate requires less than 800 cubic yards per mile of track. That's why you can speed up the job to 132 ft. of track per working hour. Less equipment and fewer men would not move so fast, but the ratio of progress would remain the same.

In addition, the excavation is reduced 50% and the number of ties to handle 66%. These also mean labor saving. And your track is out of service for a shorter period.

Ask the users of steel twin ties if you want to check these facts.

A stock of low-priced steel in hand insures a "rock bottom" price and prompt delivery. Order now and you'll be a regular user next year.

Prompt deliveries made from stock.



Permanent Track at Less Cost
Any Type Base — Open or Paved Track

The International Steel Tie Company

Manufacturers of Steel Twin Ties and Crossing Foundations

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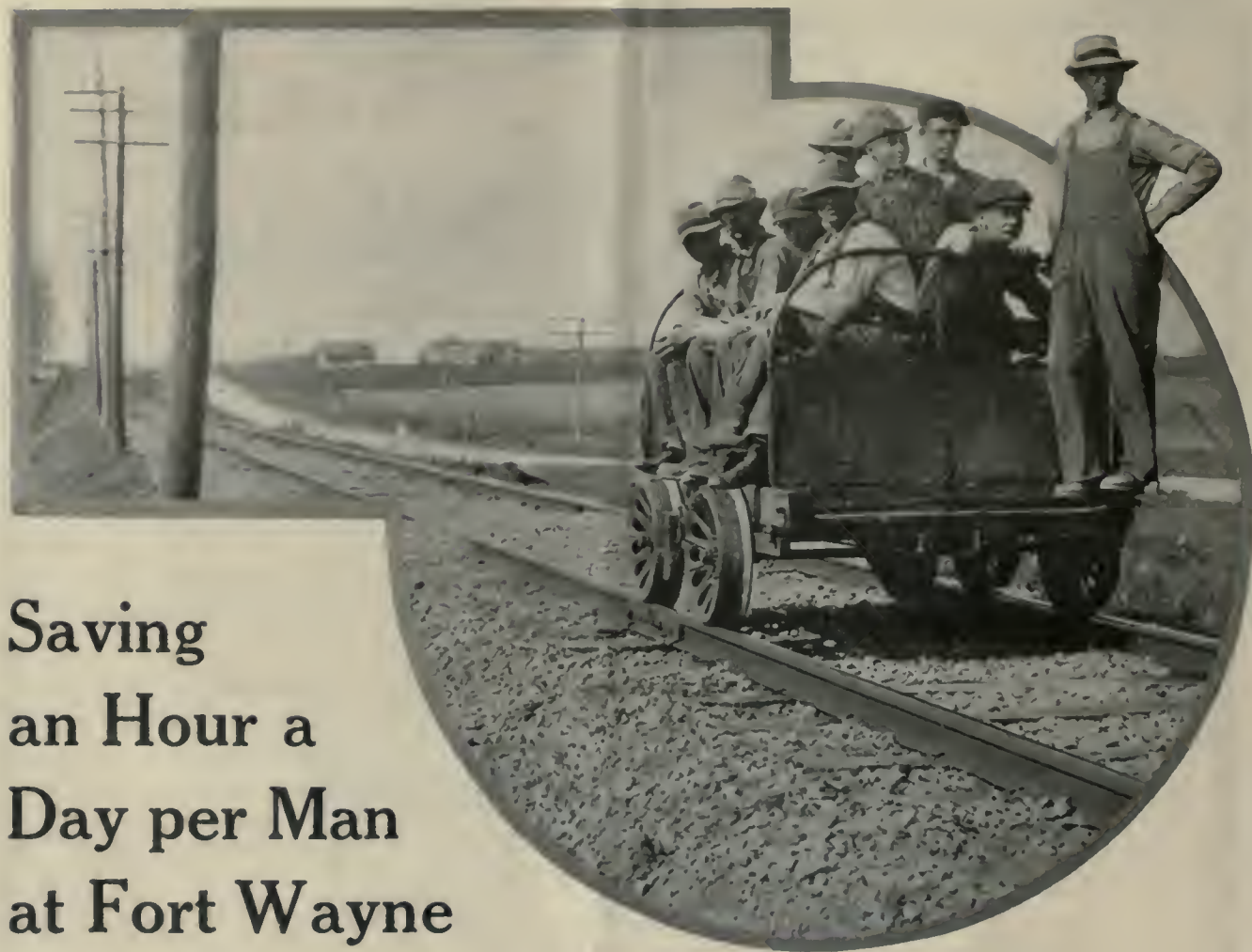
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Saving an Hour a Day per Man at Fort Wayne

The Fort Wayne & Northern Indiana Traction Co. recently bought a Mudge Motor Section Car. After four months of service—a comprehensive test—this car has shown that it **saves one hour a day per man.**

Here is a single service feature of Mudge Cars that commends them to every electric railway system in the country. It is a tangible basis on which the dollars-and-cents economy of Mudge Cars can be quickly computed.

And yet this time-saving element is not all of the

advantage of Mudge Cars. For example, contrast the effect of the ordinary hand car on the energies of a crew as compared with the effect of Mudge Transportation. With the old-style hand car your crew arrives at the work all tired out from pumping. A Mudge Car delivers them to the job fresh and ready to expand their energies in productive effort.

To sum up: Mudge cars not only save an hour a day per man but they conserve working energy. And there are other advantages which we'll be glad to tell you about on request. Write.

There's a type and size of Mudge Cars to exactly meet your needs



MUDGE & COMPANY

468 Railway Exchange

Chicago, Ill.



MUDGE MOTOR CARS



Emergency Car of the Philadelphia and West Chester Traction Co., equipped with "Golden Glow" Projectors

You Can Do it Right at Night With "Golden Glow" Projectors

We all admit that daylight is better than clusters of incandescent lamps.

But in electric railway operations, such as rail replacement, overhead repairs and bonding, daylight work is very inefficient in the time required because it has to be carried on intermittently when car service is at the maximum.

The problem has now been solved by the "Golden Glow" Projector which by giving a clear, steady and broad glow of golden light makes it possible to carry on work of *daytime quality without daytime disturbances.*

ELECTRIC SERVICE SUPPLIES CO.

Manufacturer of Railway Material and Electrical Supplies

PHILADELPHIA
17th and Cambria Sts.

NEW YORK
50 Church St.

CHICAGO
Monadnock Bldg.

Canadian Distributors: Lyman Tube & Supply Co., Montreal, Toronto, Winnipeg.



First Cost *and* Final Cost

Wooden ties, without any of the labor cost of laying, are cheaper, piece for piece, than Dayton Mechanical Ties—we freely admit that!

Untreated wooden ties completely installed with gravel ballast cost 6% more than Dayton Mechanical Ties for the same length of track.

Wooden ties, at the end of ten years, cost more than twice as much as Dayton Mechanical Ties.



Furthermore:

D.M. Ties are permanent.

D.M. Ties outlast the pavement.

D.M. Ties are cushioned with an asphalt base, under the wooden rail support.

D.M. Ties are attached to the rails as shown in the picture on the left.

D.M. Ties form a rigid, reinforced concrete bed, each tie resting on its own highly resilient cushion.

Your inquiry for full particulars regarding Mechanical Railway Ties will be a step in the direction of better economy. Write today.



THE DAYTON MECHANICAL TIE CO.

201 Third Street Arcade
DAYTON, OHIO





"ARMCO" IRON CULVERTS

Give Long Service Under Trying Conditions

The exceptional strength of their joints and the corrugated construction give great mechanical strength and resiliency in "Armco" Iron Culverts.

Because of the purity and evenness of "Armco" Iron, rusting is reduced to the minimum. "Armco" Iron Culverts resist rust—and give long and faithful service—because the elements that cause rust in iron or steel have

been reduced to the lowest point known to the industry.

Great mechanical strength and durability, combined with the ability of "Armco" Iron Culverts to remain in the position in which they are installed, even when floods have washed away the roadbed, are the reasons why "Armco" Iron Culverts give

Maximum Protection at Least Cost

Write to nearest manufacturer for full information on Rust-Resisting "ARMCO" Iron Culverts, Flumes, Siphons, Sheets, Roofing and Formed Products.

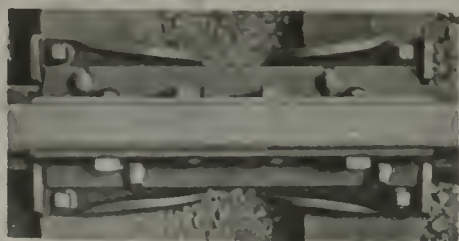
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"ARMCO" IRON RESISTS RUST



The ABBOTT RAIL-JOINT PLATE



**Send for
AND READ
Your Copy**

This book describes and copiously illustrates three appliances that every man responsible for the condition and upkeep of steam or electric railway or industrial track should know more about:

The Abbott Rail-Joint Plate

for the preservation of properly aligned track surface at rail joints, for protection of the rail ends against battering, for greater safety and for reducing maintenance expense.

The Lackawanna Safety-Head Angle Bar

for eliminating the wear and cutting that with ordinary angle bars are a frequent cause of fracture.

The Lackawanna Hook-Shoulder Tie Plate

for holding rails with great security, saving in repair expense and reducing maintenance labor.

The appliances offer possibilities that are too important to neglect. The usefulness of each under various operating conditions is explained in detail in this booklet, of which every page should be carefully read. A copy will be mailed on request.

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Lackawanna Steel Company

General Sales Office and Works: LACKAWANNA, N. Y.

ATLANTA
BOSTON

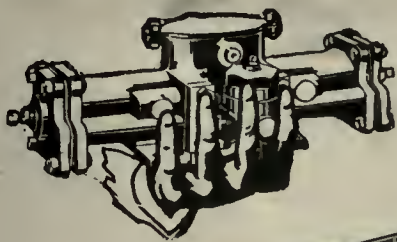
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National Pneumatic Door and Step Control

Make for High Schedule Speeds at Cleveland

Despite the operation of big trailers, the Cleveland Railway has a higher schedule speed than many a railway which operates single motor cars only.

One reason for this is the adoption of the skip-stop; and another is the extensive use of pneumatically-operated doors and steps.

As at Detroit, every car with pneumatic door and step control is equipped with **National Pneumatic** door engines.

NATIONAL PNEUMATIC COMPANY

INC.

50 Church St. New York



515 Laflin St. Chicago

The Thermit Process of Track Welding

Makes Permanent Joints

Costs Less in the End



The Thermit Process is the only method of rail welding which solves the problem by eliminating the joint, making a perfect weld between the rail heads. This method is much superior, both mechanically and electrically, to any other kind of joint. It makes a permanent union, which will last as long or longer than the rails proper. It has an electrical conductivity equal to the rail itself. Failure of a joint to conduct ALL the electricity to the power house means loss of energy, electrolysis and interference with nearby low voltage circuits.

Our Catalog No. 24, free on request, describes the Thermit insert rail weld and shows why this process is not only the best solution of the rail joint problem, but is also the least expensive method in the end, making due allowance for all considerations entering into track welding.

*May we send you this catalog, or better still,
may we discuss track welding with you?*

METAL & THERMIT CORPORATION

Successors to Goldschmidt Detinning Co. and the Goldschmidt Thermit Co.

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Skip-Stops Save Coal—

Economy Meters Show the Savings!

SKIP STOPS mean faster service at less cost for fuel and labor. If the running time, with skip stops, is shortened, the average car energy consumption may or may not thereby be reduced — BUT either *Car-Hours*, or *Kilowatt-Hours*, or both will surely be saved!

Put Economy Meters on your cars. They will bring about lower average energy consumption under any method of operation; and they will tell you line for line and car for car just what energy saving skip stops bring about — “vital statistics” right now!

The Economy Meter is the *only* power saving device whose direct readings tell whether power is being saved under varying operating conditions.

**“Meter the Energy—
That’s What You Want to Save”**

ECONOMY ELECTRIC DEVICES CO.

L. E. Gould, Pres.

Exclusive Sales Agent: Sangamo Economy Railway Meter
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“The Watchdog of Your Power”



These

Johnson Metal Tickets

and the

Johnson Fare Box

are a Success at Dallas



Since April 13 the Dallas Railway has been using the Johnson Fare Box with Johnson metal tickets as well as 5-cent cash fare. The half-rate (40 for \$1.00) school ticket and the twenty-two for \$1.00 ticket are sold at the company's office and at four big department stores. Only the children's half-rate ticket is sold on the cars. The half-rate school ticket is bronze color and the half-rate children's ticket is white, so that the conductor can distinguish them readily.

These tickets are so popular with the public that 60,000 more have been added to the original 110,000.

Ask the conductors what they think of the Johnson combination and they will tell you:

"It makes our work a lot easier than before, especially in catching mistakes."

And it's hardly necessary to add that the company is thoroughly pleased with this clean-cut way of collecting and counting fares.

If you are contemplating an increase in your rate or fare, remember that the same Johnson Metal Ticket can be made to represent any unit you choose.

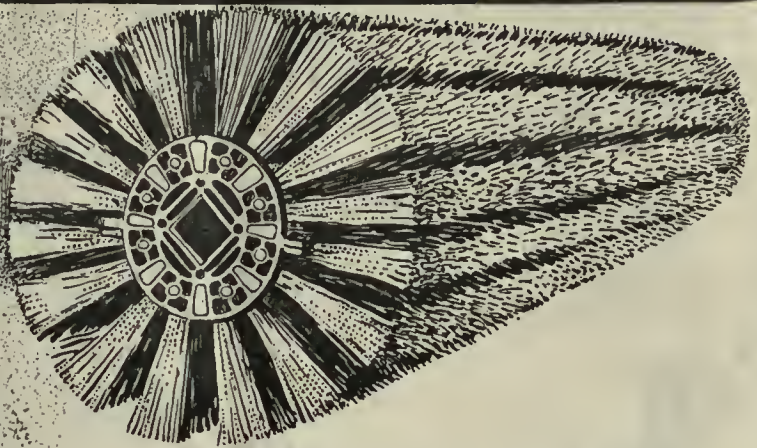
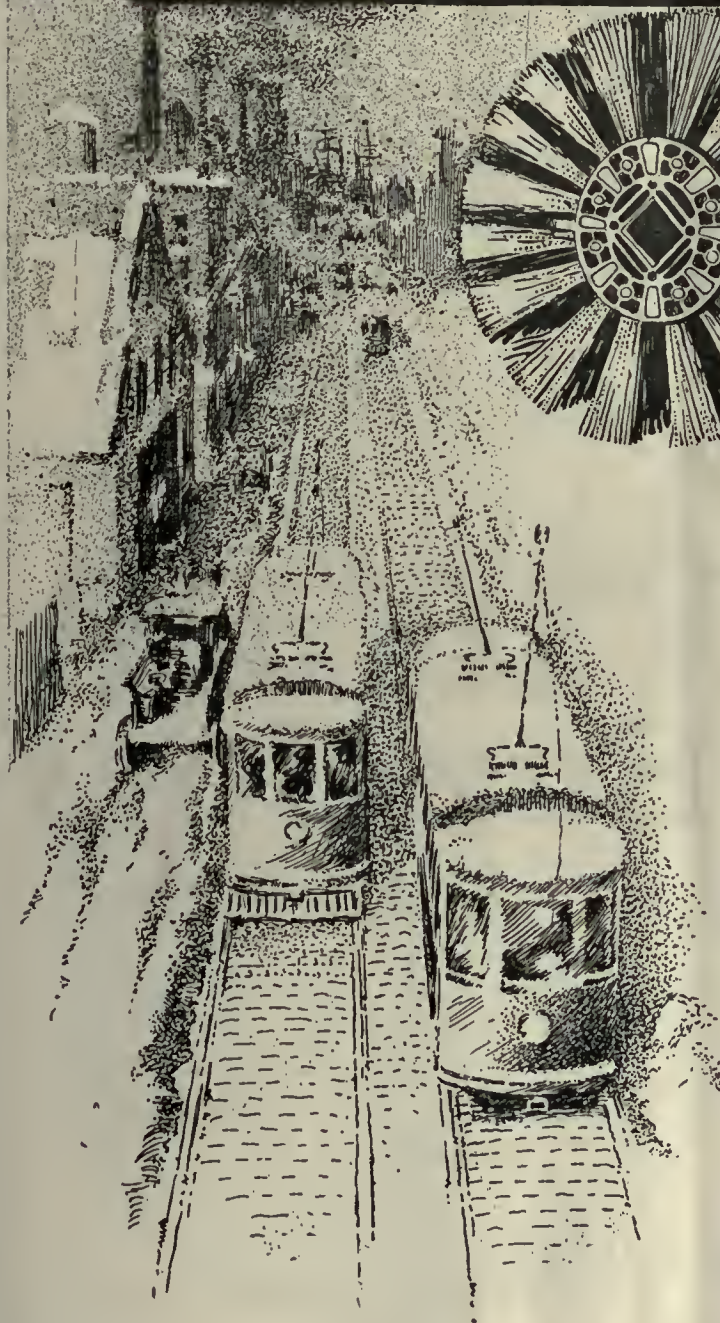
JOHNSON FARE BOX COMPANY

Jackson Boulevard and Robey St., Chicago

50 East 42nd Street, New York

Remmele Broom

MAKES THE SWEEPER



There was never a time when the need of an efficient street railway broom was more urgent. Road and rails **MUST** be kept free from snow, slush and ice in the coming winter. City and Intercity passenger transportation **MUST** be kept open. To neglect these facilities is to handicap the Government. Every minute lost by the thousands of employees reaching the factories turning out war essentials cannot be made up or recalled. But it can be prevented.

Last winter's plight of the street railway executives and road managers should not be repeated. The ordinary broom did not fulfill the task of keeping the roads open. With the invention of the Remmele broom, it's no longer necessary to have street railways tied up, handicapping the Government in its work.

The Remmele broom saves 50 per cent. on reeds. It is refilled in less than 60 minutes. Other styles take from 6 to 10 hours. The reeds wear longer; they don't break off. You save the investment of extra equipment, require less motormen and conductors to do snow cleaning. The construction is strong and stands the pounding on the pavements at a speed of 400 revolutions per minute. It actually eats the snow. It will go through 24-in. snow banks like a hot knife through butter. The way it is built is found to be the practical solution of adding resiliency and toughness to the reeds so necessary to a good working broom. It never disarranges your schedules. Passengers and city officials are pleased with the service. It saves thousands of fares in the stormy seasons. Your system is always in service. It saves overhead; makes the operating department or traffic manager feel happy.

The only thing that wears are the reeds and they wear down to nothing.

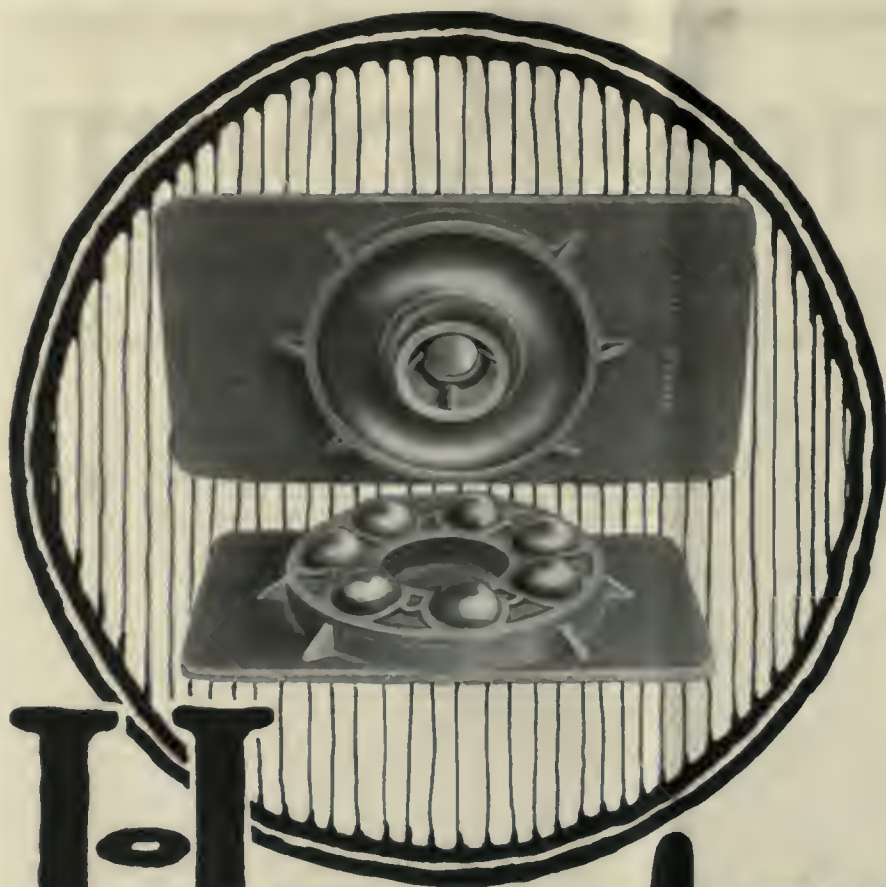
It can be used on your old equipment without changes.

Write for a try-out proposition.

Remmele & Maier

CHAS. E. MAIER, Pres. and Mgr.

370-372 South 7th Street, Newark, N. J.



Why continue to use friction center plates when you can get a bearing like the Hartman at no greater cost?

Order a Car Set and Save Flanges

Hartman Center Bearings

Hartman bearings are self-centering. They keep the trucks rolling straight and on leaving curves they straighten the truck with only slight pressure on wheel flanges. Consequently wheels on Hartman-equipped trucks last longer, trucks nose less and power consumption decreases. They reduce pull-ins.

Raceways of Hartman center bearings do not pit and balls do not crush. There is no wear to cause trouble and no lubrication is required. The balls are $2\frac{1}{8}$ inches in diameter and give ample bearing surface. These bearings can be easily put on nearly any truck, new or old. With these plates your troubles cease.

Holden & White Inc.

Electric Railway Distributors for The Joliet Railway Supply Company

817 Fisher Bldg., Chicago

National Rwy. Appliance Co., New York; Washington; W. M. McClintock, St. Paul; Alfred Connor, Denver; C. E. A. Carr, Toronto; F. F. Bodler, San Francisco; S. I. Wallace, Los Angeles; W. F. McKenney, Portland; O. H. Davidson Equip. Co., Salt Lake City.



Toughness

where a car wheel
should be tough.

Hardness

where a car wheel
should be hard.

Ductility

where a car wheel
should be ductile.

That's the Davis
One-wear Steel
Wheel.

Safe, economical,
long-wearing.

American
Steel Foundries.

1100 McCormick Building
CHICAGO

DAVIS STEEL WHEELS

NORTH CAROLINA



Most Everywhere You Will Find H-B LIFE GUARDS

Wherever you see good railway service, there you are pretty certain to find the H-B Life Guard.

Nothing more natural because *Good Service* necessarily includes *Safe Service*.

That's the case at Wilmington, N. C., which has the H-B Life Guard on its city cars.

Since the H-B with its instantaneous tripping action was placed on the market the need to rely upon uncertain and unsafe devices has been entirely eliminated.

Your front-end safety insurance cannot be rated A1 without the H-B Life Guard!

The Consolidated Car Fender Co.

Providence, R. I.

General Sales Agent

Wendell & MacDuffie Co.

61 Broadway, N. Y.



Sir Goldsworthy Gurney built a steam carriage in 1828 that seemed to bear out the most optimistic hopes of early inventors. For four months, four times a day, this carriage made its one mile trips in less than 50 minutes without an accident. Its career was brought to an end and the development of steam carriages practically killed when, due to the malicious plotting of the enemies of progress, the "Turnpike Act" became a law.

This act made the profitable operation of steam carriages practically impossible because it so restricted their speed on public highways.

The Railroad Reared Its Head from the Steam Carriage Ruins

—and with the development of travel by rail the need for the lumbering road carriage was no longer felt.

Smoother and speedier travel was the order of the day—and the railroads met the demand.

The rapid growth of the cities due to the quicker transportation offered by the railroads would not have been so readily possible had there not been concurrent expansion in the street railway field.

The rapid expansion of the electric railways of our cities has made possible the swift development of the world's centers—made it possible for the workman to enjoy a home miles away from crowded factory districts, for farm lands to be laid out in city squares; made possible the rapid transportation of farm products to profitable city markets.

In short, our electric railways have been, to a large extent, the prime factor in the growth of most of our cities.

Galena Oils

and Galena Service — have helped to make possible the increased speeds, longer runs and heavier loads of today, without which the present high efficiencies of our electric lines could not have been attained.

By developing a lubricant that gave a higher service efficiency than had ever before been thought possible.

By creating a lubricating service that has helped railway men to solve problems pertaining to lubrication and helped them to improve lubricating methods, this company feels that it has been a real factor in the electric railway development of this country.

Today Galena Oils are the recognized standard lubricants for railway equipment—they have been for nearly 50 years.

Galena-Signal Oil Co.

Franklin, Pa.



The "brains" of the electric furnace where the electrical input is controlled—automatically insuring predetermined temperatures.

"Electroheat" Axles

Fulfill the
Safety and Service
Requirements of

Any
Railway
Application

"ELECTROHEAT" is the mark of an achievement in axle making.

It stands for a process of electric furnace heat treatment that insures not only better axles, but manufacturing uniformity in production—a process applied and exclusively practised in axle making by Laclede Steel engineers.

The proper heat treatment of axle steel requires the even application of certain heats uniformly applied. Herein lies the superiority of the electric furnace over old-time "fuel" furnace processes. Its inherent operating characteristics and construction provide positive automatic temperature control, enabling

the entire operation of annealing or quenching and tempering of the steel forgings to be carried forward under perfect control and with absolute uniformity.

Service failures due to breakage, bending and excessive journal wear are thereby minimized because a steel structure possessing maximum strength and toughness is a scientific certainty.

That's why "Electroheat" Axles have to give better service. The process is metallurgically right!

NOTE.—"Electroheat" Armature Shafts possess the same torsional and shock-resisting qualities as "Electroheat" Axles, being heat treated by the same process. They minimize service breakdowns and maintenance costs.



"If Heat-Treated Electrically—It's a VALSCO"

LACLEDE STEEL COMPANY

General Offices—Federal Reserve Bank Building
SAINT LOUIS, MO., U. S. A.

Rico Coasting Recorder

*Adopted by
Capital
Traction
Company
Washington, D. C.*



The Capital Traction Company was the first road to adopt the "skip-stop" for the entire system at the instigation of the Fuel Administration—primarily to CONSERVE COAL.

By adopting Rico Coasting Recorders—of which 300 have just been ordered—the Capital Traction Company will get the full benefit of the skip-stop, for every one of their motormen will become interested to "do his bit" by COASTING whenever possible with due regard for all operating rules of the company. The *printed record* obtained by the individual Motorman's Key will show each man how well he operated his car on every trip.

MORE COASTING → LESS POWER
LESS POWER → LESS COAL



In addition to CONSERVING COAL by encouraging the motormen to "coast," the Rico Coasting Recorder insures *improved car operation* by disclosing *slack in schedules*—an important detail which no other Motorman's Efficiency Checking System can possibly indicate.

Time is the Essence of Railroading

RAILWAY IMPROVEMENT CO.



61 BROADWAY, NEW YORK



There's a Right Grade of Brush for every Motor

The selection of carbon brushes for railway motors calls for exact knowledge of conditions and equipments. It is impossible for one grade of brush to fit satisfactorily all equipments.

Commutator troubles are often caused by inserting the brush that happens to be handiest without regard to the requirements. For this reason

G-E Brushes

are furnished in grades to meet any condition. The exact grade for your particular motors can be determined by our specialists after a study of the situation.

General Electric Company

General Office:

Schenectady, N. Y.

Sales Offices in All Large Cities

Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

Volume 52

New York, Saturday, August 31, 1918

Number 9

"One-Man Cars Apparently Save Only in Power and Platform Expense"

IN SENSE this is an actual quotation from a report of a traffic man who was asked to discuss the feasibility of light-weight one-man cars for his property. Please note the word "only." On this particular road power is 15 per cent and transportation 50 per cent, or "only" 65 per cent of the total operating expense! Another 15 per cent includes track and other items which would surely decrease with light cars, but the speaker did not think a car which affected 80 per cent of his costs important enough to change his hidebound practices of a generation. Yet in his own town of 50,000 the private automobile is so rampant that even two seats per passenger with the present big cars have failed to keep it down. In other words, the street railway offers ample service but in the wrong-size packages. The same number of seats in smaller cars would soon put rust on the hinge of many a garage.

Still, what can we expect from men who use the word "only" about the two controlling accounts and whose excuse is the old rubbish of "The people of this city would never stand for cars run by one man." This is mental inertia with a vengeance!

It's Time Now to Think of Next Winter's Snow

THE memory of last winter's unusual experience in fighting, but not always overcoming, in their contests with snowstorms is still fresh in the minds of railway managers in several parts of the country. It will therefore be somewhat easier than usual to stir up interest in preparation for the coming fray. Several articles in this issue of the ELECTRIC RAILWAY JOURNAL will be useful in this connection.

The secrets of successful snow fighting, if such obvious facts can be called secrets, are these: Provide adequate equipment; organize for the conflict; instill the combative spirit in the organization; get ahead of the storm. All of this requires preparation for weeks or months in advance, and there are indications that this fact is increasingly appreciated. One evidence that the public has of the real desire of the railways to give good service is furnished by the sight of electric cars plowing through the storms when other vehicles, including jitneys, are safe and snug in their garages or barns. This is possible only when thorough preparation has been made.

Complaint has reached the office of this paper to the effect that the literature of snow fighting is in-

adequate; that railways desiring adequately to fortify themselves could not learn readily what other roads have done in this line. A study of the recent files of the JOURNAL will, however, yield a surprising fund of information regarding special apparatus, adaptation of existing equipment for this duty, mapping out of routine and emergency procedure in snow time, and education of employees in the principles and practice of the art of snow fighting. Each season adds to this reference material. It is worthy of careful study and application between now and winter.

Electric Railway Industry Must Pull Itself Together

FOR patriotic reasons the executive committee of the American Electric Railway Association voted last week to rescind its decision to hold an annual convention this year at Atlantic City, and the convention will consequently be omitted. The original date for the meeting, Oct. 8-10, was decided upon last April, at a time, of course, long before the announcement of the date set for the fourth Liberty Loan drive. When Secretary McAdoo announced that this drive would begin on Sept. 28 and would continue for three weeks, which included the date set for the Atlantic City convention, a reconsideration of the date of the convention seemed desirable for the reason that many railway operators and manufacturers who would otherwise like to attend the convention would be active at home in local loan campaigns. This led up to the question of the wisdom of holding the convention at all.

There is much to be said on both sides, but the matter is now definitely settled and further discussion is idle. The main thing is to prepare to make the most of the conference meeting that will replace the convention. The latter in any case could not have been very largely attended. In all probability the attendance at the conference will be made up largely of the same men who would have gone to the convention. The change will make no difference, however, in the date of publication of our special number which was scheduled for Sept. 28, as the topic selected for that issue is "War Service and Efficiency." This subject is particularly appropriate at this time even without a convention and independent of the date which may be set for the conference that will take the place of the convention.

Some kind of a meeting or meetings of the industry appear to us to be essential at this time, and for this reason: A part of the present crisis in the railway

business is due to the lack of what may be termed an "industry consciousness." This was closely pointed out by speakers at last week's conference in New York. Such consciousness and the unity which goes with it must be developed and developed speedily. This cannot be done by correspondence. It needs the contact of mind on mind in discussion and debate. Circumstances are hastening the evolution of this consciousness, but it must be evolved from within. The recent New York meeting was helpful in this direction; the even more representative meeting to come will be still more so.

Federal Government Increasingly Powerful in Electric Railway Affairs

THE advent of the national government in the electric railway field, through the War Labor Board in its mediation in labor controversies, the Emergency Fleet Corporation in its financing of extensions, the War Finance Corporation in its assisting in financing operations, etc., brings into being a new set of conditions for the railways to face. They can no longer consider themselves as detached local units, but realize now as never before that they must stand together if they are to do their full duty and at the same time preserve the integrity of the vast capital intrusted to them.

The industry is at present represented nationally by the Electric Railway War Board of the American Association. It is through this board that many of the relations with the government can best be fostered. It was at the instance of this board that a remarkably representative gathering of executives was held last week in New York to consider a report as to what the board is doing at Washington. A brief outline of the conference was printed in last week's issue. Obviously this conference was largely of an important character in which the executives talked very frankly about their own particular problems, but certain elements of the discussion demand widespread attention. Let us consider two or three of these.

First, in its conference with government officials the War Board needs facts. Electric railway data for the country as a whole are very scarce; the War Board has to collect them for itself. Hence the urgency of prompt compliance with requests for figures. The board can do practically nothing without them. Second, but closely allied with the first, the industry must develop in solidarity as suggested earlier in this article. Third, the present crisis, to the acuteness of which the findings of the War Labor Board have so largely contributed, seems certainly to demand federal influence in the adjustment of rates.

The way out of the present difficulty must and will be found. In the meantime it is up to the railways, individually and collectively, to do the best they can with the local authorities, while to the limit backing the War Board in its efforts to visualize the situation to the powers that be. Under the present emergency conditions the only hope of general relief is in the federal government, hence the urgency of such adequate support of the War Board that it will be seen to be truly representative of the industry.

Farmers Object to Road Damage from Motor Trucks

IF ONE may judge from the tone of an editorial in a recent issue of the *Ohio Farmer*, the agricultural interests are not viewing the matter of motor truck haulage with a very friendly eye. This well-known farm journal makes the statement that "the agitation for rural and inter-city truck service is largely discounted by the damage that is being done to improved highways by heavy trucks." As illustrative of the causes of highway failure it quotes the county commissioners of Cuyahoga County (Cleveland, Ohio) as saying that trucks weighing 20 tons or more are often run at rates of 25 m.p.h. over the county highways. It further points out that one fine brick road built two years ago at a cost of \$70,000 was recently practically ruined in the course of a few weeks by extra activity in motor truck freight haulage. In the northwestern part of the same State the writer recently had occasion to drive over roads which he had traveled more than a year before. At that time it was a macadam pike in excellent condition. Now it is a trail of cuts, gullies and ridges, nearly impassable in dry weather, altogether so in wet, all the results of a few months of heavy trucking.

When it is remembered that a good modern highway costs about the same as the roadway of an interurban railway it will be seen that, from the standpoint of helping out the government-controlled steam railroads and facilitating local transportation, county officials might with far more reason build and maintain roadways for electric railways than highways for the benefit of those engaged in the business of freight haulage by the way of motor trucks. This is another instance where sane, wide-open publicity in widely-read local papers would redound not only to the advantage of the railways but of the public at large.

Seeing Through Walls of Brick and Steel in the Boiler Room

DESPITE all of our really remarkable work in the generator room of the power house in the way of instruments and methods for improving the operation of electrical machines, average boiler room practice is conspicuous by lack of actual measurement of conditions and results. On the average we are much like the merchant who accounts for his sales to the minutest detail but lets the other equally important end of his business, the purchases, take care of itself. In other words, the average boiler room needs, and needs sadly, methods and instruments for the determination of operating conditions. Our firemen need eyes wherewith to see through the walls of brick and steel of their machine. This need has been recognized by the United States Fuel Administration, as the first three recommendations of its engineering division relative to fuel saving pertain to this very thing. The day is past when a fireman, no matter how skillful and faithful to his task he may be, can by sighting at the fire over his corn-cob pipe tell whether a boiler is successfully doing its work. The steam gage, the pop valve and the gage cocks, introduced as they were to keep the boiler from starting off on privately conducted skyrocket trips, give no indications relative to a lot of other necessary things.

To-day not only the development of new methods and processes, but the successful operation of existing processes, is largely dependent on the use of instruments which tell the story of what is happening on the inside of things. In the field of electrical engineering, for instance, such instruments have attained a very high degree of perfection. The power output of a 50,000-kw. generator is measured as easily as is the time of day, and the oscillograph has permitted a study of the currents inside a machine almost as readily as a schoolboy studies the motions of a pollywog with a magnifying glass. And, take it all in all, a battery of steam boilers is to-day a more complicated thing to operate than is an electrical generator. We need to know whether each boiler is doing its share instead of "loafing," how much fuel and water are going into it, the amount and quality of its output, the amount of unburned fuel in the ash pile and the smoke, the draft, the amount of excess air and the amount of heat going up the chimney. It takes more than our five senses to tell us about these things. When they are known we have first-hand knowledge as to whether the dampers are set right, the baffle walls intact and the stoking correct. More important, we know it at once if the losses become excessive, for after all knowledge of losses is more important than knowledge of efficiency. If we know the losses are small there can be no question as to what the efficiency is, and the losses are the easiest things to get in contact with.

Many instruments, more or less perfect, for determining the above details and relations are on the market. More and better ones will appear when boiler users learn of their need and value. Even now records are available where plants burning as little as 600 tons of coal per month have paid for a complete instrument equipment out of the fuel savings of a very few months. Obviously the meters must be well selected and conveniently located and, in general, recording instruments are best. In any event meters that will assist the fireman are the ones needed. The old idea of meters to "show up" the men is all wrong. The men should be instructed as to proper use of the instruments and stimulated to use them in securing better results as the product of the efforts. Only when it is put up to the men that the instruments are helpers and not detectives will the best results be secured.

Too Much Home Manufacture Bars Progress

THE chance remark, "Is that scheme patented?" by a manager whose property built very large shops a long time ago, made us realize recently what a handicap eventually may be suffered by the railway which has loaded itself down with a manufacturing plant. This particular property never had such an impelling motive as isolation for making almost anything that can be made. Its railroad facilities are splendid and it is also within a few hundred miles of great manufacturing and distributing centers. This was true when, nearly twenty years ago, the then management erected a large plant and so tied up a large amount of money.

What has been the result? An almost absolute cessation of progress. Every time specialist manufacturers brought out better products—whether trolley wheels, destination signs, door mechanisms, brake shoes or

what not—they knew it was next to hopeless to get this railway to use the devices, for didn't the railway have masterly mechanics who could produce something just as good and a lot cheaper at that? The management which had made the decision of course felt that it must keep the big plant busy, even if it did turn out products which meant higher operating and upkeep costs.

The situation is considerably simplified in this case because a new management is now in charge which is not bound by precedent and does not have to swallow the mortification of acknowledging a blunder. The new management frankly realizes that no one railway could possibly have more inventive talent than all the specialist manufacturers who have the entire experience of the industry to draw upon for ideas. Therefore this railway is now working on the sound basis of using the best there is, even if it cannot be made at home.

San Francisco Bus Philanthropy Willfully Misunderstood

THE figures published elsewhere in this issue on bus operations of the San Francisco Municipal Railway are rather mournful evidence that municipally-owned lines are not learning much from the sad experience of privately-owned electric railways, that subsidizing the suburbanite is the road to bankruptcy. The Municipal Railways management is too capable not to realize that you cannot make money by handing the maximum haul rider a free bus ride as *lagniappe*. Therefore, this is frankly a development proposition in which the municipality as a whole may recoup itself for transportation losses by more taxes from appreciated realty values. In such a case the municipal transportation should be grouped with the parks, charitable institutions and other municipal undertakings from which no profit is expected. But if the street railway and auxiliary bus service are not to be self-sustaining, let the public so understand. Unfortunately, whatever the views of the operators may be, the demagogic newspapers of San Francisco and elsewhere still insist that municipal railways are necessarily profitable because they are municipal.

How much harm such misrepresentation is doing can be conceived from one instance in which this very San Francisco bus philanthropy was used as proof positive that the bus was cheaper and better than any street car could be. The bus protagonist, we learned, got his idea from a newspaper clipping which we espied on the wall of his office. This clipping had a line-up of the buses referred to in our article over the cheery caption "San Francisco Municipal Buses a Huge Success." The article gave no costs whatever but did say the buses were giving fine service and making money for the city. To some minds all intake is clear profit. That seems to have been the case with our interlocutor so far as buses are concerned. It was a hard task to convince him that the city, through its own railway, was really conducting a charity for a select few of its suburbanites and that the citizens as a whole had to foot the bill. If a street railway reformer can fall into such blunders, what shall we say of the run-of-mine citizen?



SCENES IN THE CONNECTICUT COMPANY'S RECLAMATION SHOP

Figs. 1 and 2—General Views in the Machine Shop. FIG. 2—The Armature Winding Room Where Only Women Are Employed. FIG. 4—Handling and Testing Armatures. FIG. 5—Receiving Section with Typical Piles of Equipment Parts. FIG. 6—Welding Division with Two Very Common Jobs Under Way.

Connecticut Company Centralizes Reclamation Work at New Haven

By Segregating Heavy Repairs, Manufacturing Operations and Reclaiming of Damaged Equipment This Company Has Achieved Substantial Economies—The Feminine Element Bids Fair to Predominate in the Reclamation Shop

A CONSIDERABLE step in the direction of rolling stock maintenance economy has been taken by the Connecticut Company during the last few months by the installation of a "reclamation" shop at New Haven. The management was convinced that by relieving the division shops of everything but routine maintenance work it would be possible to reduce labor and materials costs for several reasons. In the first place, the work of the division shops would be facilitated because there would be no distraction due to special jobs of all kinds. Again, such detailed parts as the company found it wise to manufacture could be made best at a central shop. Most important of all, a shop whose specialty is reclamation work would naturally use every means available to make the most of broken or worn-out equipment. The reclamation shop is proving of great assistance along the lines indicated, especially in view of the acute labor shortage.

The shop is at the corner of Ferry and River Streets, where there are excellent water and railroad transportation facilities. It is part of what was originally a paint shop, later used as a storeroom. From this have been partitioned off a large general machine shop and a long narrow room partly used for the reception of pieces to be repaired and partly for welding work. Portions of the large room are in turn partitioned off to form a winding room and an office. The general appearance of these several sections is shown in the photographs reproduced on the opposite page.

The local or division shops will continue to take care of light repairs, including those of open circuits, grounds, etc., where rewinding is unnecessary. The reclamation shop is entirely independent of the maintenance shop at New Haven, being located in a different section of the city.

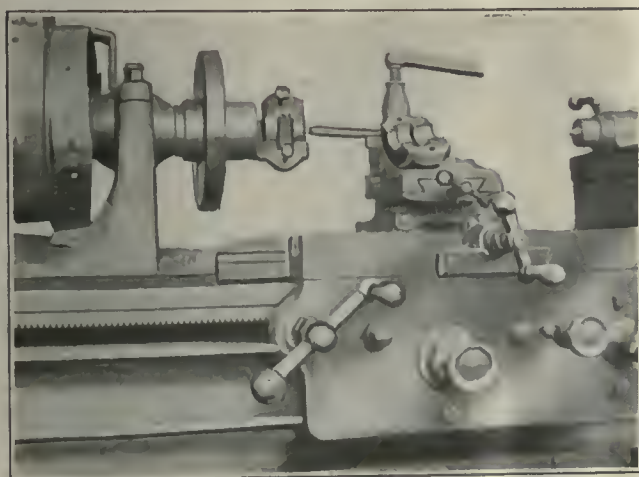
Before the present plan of centralized reclamation was inaugurated it was necessary to send out a good deal of the winding work, but this will no longer be necessary. The new shop is able to handle not only the work on the rolling stock but also helps out the power department. For example, at present the trucks for a traveling crane to be used in the coal storage yard connected with the power plant at New Haven are being fabricated. Other special jobs now under way are the building of some pit jacks for use in the maintenance shops and some apparatus for handling sand pneumatically.

The work of the reclamation shop is greatly facilitated by the regular operation of the general storeroom supply car, which reaches every division of the property once a week. The car moves in accordance with the following schedule: Monday—Bridgeport, Westport, Norwalk, Stamford and Port Chester; Tuesday—loading at storeroom; Wednesday—Meriden, New Britain, Hartford and Middletown; Thursday—loading at storeroom; Friday—Waterbury (via Cheshire) and Derby.

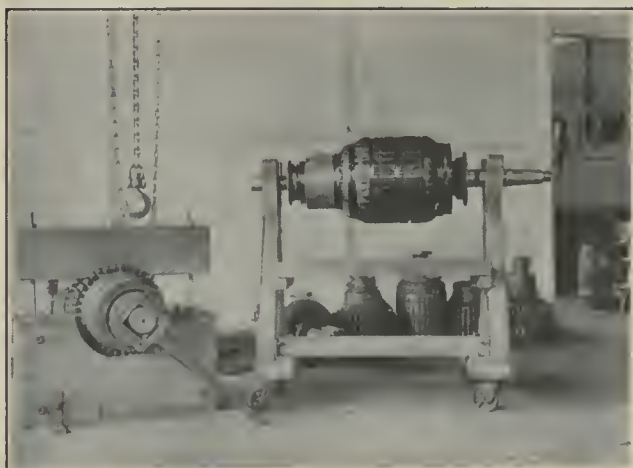
The supply car gathers up all material which is to be welded, armatures to be repaired, etc., and in return delivers repair parts and supplies. The car is run right into the reclamation shop on a special track laid so as to facilitate the handling of the equipment.

NEW SHOP HAS VARIED EQUIPMENT

In the armature section of the shop the principal equipment consists of an armature coil winding machine, a field winding machine and a banding lathe. In the machine room are three engine lathes, a turret lathe, a boring mill, an axle lathe, a key seater, a drill press, a hacksaw machine, an emery grinder, a 100-ton wheel press and an axle straightener. The power supply



CHUCK FOR HOLDING COMPRESSOR MOTOR ARMATURE BEARING DURING BORING PROCESS
(Cap of chuck rests against tool post)



AT LEFT, WOOD CLAMP USED FOR HOLDING ARMATURE WHILE COMMUTATOR NUT IS BEING TIGHTENED.
AT RIGHT, STANDARD ARMATURE STAND

THE CONNECTICUT COMPANY

Daily Report Reclamation Shop Production

New Haven, Conn. _____ 19__

Mr. H. W. Beebe,
Supervisor of Equipment,
New Haven, Conn.

Dear Sir:-

To-day _____ the following finished products
were turned out at the Reclamation Shop.

SHOP ORDER	QUANTITY	ARTICLE	DIVISION	CHARACTER OF WORK

SIGNED _____
Master Mechanic

SUPERVISOR'S DAILY REPORT FORM

for the shop is a 50-hp. motor operated from the trolley circuit.

Overhead in the shop is a Columbia overhead trolley bar which serves the lathes and other machines, chain hoists being used on this at present. The shop is supplied with air, however, for the purpose of permitting the use of air hoists which will be installed later.

One of the most important parts of the work of the shop is the electric and gas welding. The section devoted to this purpose contains a Westinghouse 150-amp. generator and a Wilson 150-amp. generator. There is also a large motor-generator set of foreign make which was purchased from the Atlantic Welding Corporation to furnish heavy current for rough cutting work. For general cutting purposes an oxweld gas outfit is preferred.

PROCEDURE IN CONNECTION WITH REPAIR WORK

When a piece is to be repaired in the reclamation shop the following course is pursued : As the piece leaves the division carhouse it is tagged with a round aluminum tag containing a serial number. At the carhouse a list of the tag numbers is kept, and a shop order is made up from this list calling for the necessary repairs and giving requisite specifications. This tag number follows the job throughout its course and all labor and material are charged to it.

It is impracticable here to go into all details of the

operation of the shop, but a few examples have been selected to indicate the scope and method of its work. For example, an important item is the repair of gear cases. For use in patching these by welding all kinds of sheet metal are collected from the system, including old dasher iron, scrap steel, old stack plates, controller covers, etc. Besides gear cases, this shop also welds motor shells, armature shafts, car axles, truck frames, journal housings and many other parts. One operation which has proved very profitable, here as elsewhere, is the cutting down of broken car axles for use as motor armature shafts, and the reclaiming of armature shafts by welding.

When a shaft is broken it is reclaimed by welding if the break comes inside the bearing, but not if it comes between the end of the bearing and the end of the core. In reclaiming, the broken ends are turned down to conical form, and a 1/2-in. dowel pin is used to center the two broken parts. After the cylindrical groove has been filled with the welding material and

FOREMAN'S REQUISITION FOR MATERIAL

To Storekeeper:
Please deliver the following to bearer

Charge to _____

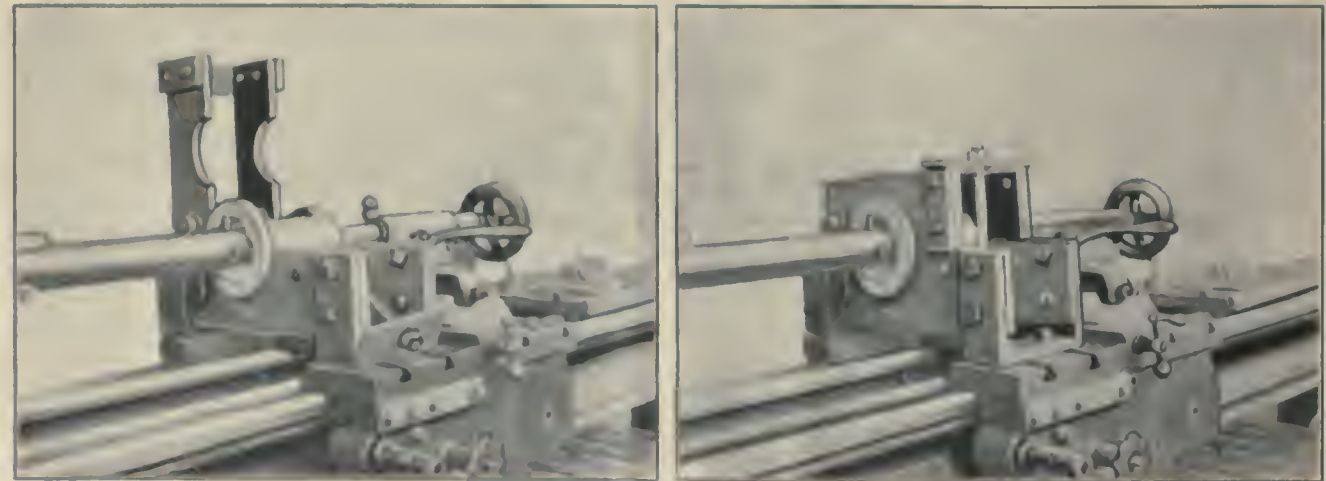
Quantity	DESCRIPTION	Weight or Measure	Price	Amount

Delivered _____ Price and extensions correct _____ Signed _____
Foreman

A SIMPLE FORM OF REQUISITION ON STOREKEEPER

the axle has been turned off, it is found to be practically as good as new, especially as the weld is not subjected to any bending moment.

In the line of manufacturing operations the shop is making all trolley wheels in 4 1/2-in. and 5 1/2-in. sizes, turning all axles and armature shafts, making axle bearings and linings, armature bearings, compressor crankshaft bearings and compressor armature coils. Practically all rewinding work for the Connecticut Company's system, including both air compressors and car motors, is done in this shop.



JIG FOR HOLDING AXLE BEARING DURING BORING PROCESS. AT LEFT, JIG OPEN; AT RIGHT, JIG CLOSED

As the shop is new there has not as yet been time to develop the full line of jigs, mandrels, chucks, etc., which will eventually be required, but a number have already been finished. A few of these have been shown in the small photographs reproduced with this article. One of these is a jig for holding axle bearings during the boring process after they have been turned on the mandrel shown in the pen sketch on this page. The jig consists of a lower part which rests on the lathe bed with an upper part hinged to it, a simple clamp serving to hold the two parts together with the bearing in position. The photographs show the jig open and closed. The mandrel, mentioned above, holds the two-part bearings in place by means of clamped nuts. Another device shown is a lathe chuck for use in boring compressor bearings. The chuck consists of two pieces recessed to accommodate the bearings, one attached to the lathe face plate and the other bolted to the first as indicated.

Among other interesting devices in the shop is the wood armature clamp shown in one of the pictures, which is used to hold the armature securely while the commutator nut is being tightened. This clamp serves greatly to reduce the amount of labor required in the simple operation. The same picture shows the standard armature stand used in the shop.

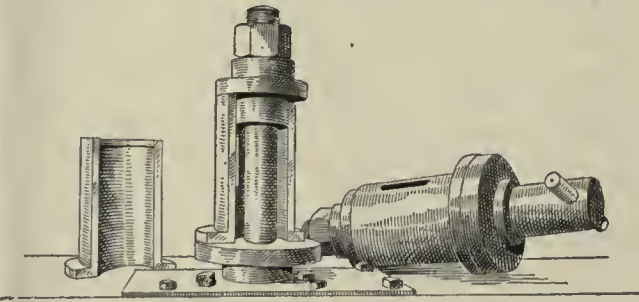
ONE-HALF THE WORKERS IN THE SHOP ARE WOMEN

The total force employed in the new shop at present numbers twenty-four, including one clerk. Twelve of the employees are women and they are engaged as follows: One makes all coils, including field coils for air compressors; one does the banding on all kinds of armatures; two run engine lathes up to 14 in., but the

but data are being accumulated for the purpose of enabling specially skilled workers to receive commensurate rewards for their work.

STEPS IN THE DIRECTION OF STANDARDIZATION

The management of the Connecticut Company realizes that to make the most of this new shop it is necessary to have accurate and complete records. For this purpose a few simple forms are being developed, as shown on this and the preceding pages. One is the requisition form which applies to the work of the reclamation



MANDREL FOR HOLDING AXLE BEARING DURING TURNING PROCESS

shop as well as to all supplies. Another is a form which shows exactly how much work has been turned out in the shop each day, thus giving a convenient check on the relation of output to number of employees. The third is an experimental form which is being tried out with a view to accurate allocation of costs, as well as determination of the speed with which work is being put through the shops. Obviously these cost charts will be very valuable if later the premium system is put in. The shop has been operating such a short time that no cost data are as yet available, but considered as a whole there has been a very noticeable saving in labor and materials. It is hoped that in a short time actual cost figures can be given. In view of the facts that practically all of the machine tools were taken from the existing shops and that no new buildings were required for the present undertaking, the required investment has been very small.

Reclamation Shop

COST CARD

Order No. Tag No.

Description

Date	Workman	Hrs.	Rate	Date	Material	Cost

EXPERIMENTAL FORM FOR COLLECTING COST DATA

work is put into the lathe by a man; eight are armature winders trained to do work on all kinds of armatures. It has been found that after reasonable training women are able to do as good work in winding as the men, but of course it is necessary for them to have assistance in heavy moving, transferring armatures from the stand to the banding lathes and to the storage racks, etc. The women are paid the same rates as the men for the same work.

The company is considering putting a premium system into operation in this shop where the work seems admirably adapted for this purpose. At present the operations have not become sufficiently standardized,

Snow-Fighting References

The Library of the Bureau of Railway Economics at Washington has recently issued a fifty-three-page mimeographed list of references to articles on "Winter Service on Railroads." It is divided into five parts, namely: (1) Maintenance of way in winter in the United States; (2) operation of railroads in winter in the United States; (3) snow fighting on electric roads; (4) winter service conditions in Alaska and Canada; (5) winter service conditions on European railroads. There are thirty references in Sec. 3, and some of the references go back to as far as 1891. The following references to recent articles in the ELECTRIC RAILWAY JOURNAL are supplementary to the above list, which is not very complete with respect to electric railway snow-fighting: Mar. 23, 1918, page 579; Feb. 16, page 332; Feb. 9, page 285; Nov. 24, 1917, page 951; Nov. 3, page 826; Feb. 17, page 304; Jan. 6, page 39; April 1, 1916, page 658; Jan. 22, page 162; Jan. 8, page 94.

Snow Fighting in Montreal*

How a Far Northern City Keeps Its Streets Clear During Its Long, Severe Winters—
Esprit de Corps in the Organization Essential to Success

By ARTHUR GABOURY

Superintendent Montreal Tramways

THE snow-fighting force of the Montreal Tramways comprises three separate elements, each necessary to a successful, complete unit. They are: *Experience, Esprit de Corps and Machines.*—Experience in every one of the employees of the snow-fighting staff, from the head down to the switchman; *esprit de corps* between every one from the head down to the switchman and entire confidence in one another; and machines, the best that science and experience have so far produced.

These three elements combined and added to a staff of assistants and carmen imbued with the determination to overcome obstacles is the secret of the successful results obtained in the past years in maintaining a car service for the public of Montreal during snow storms and blizzards.

The snowfall for the last twenty winters has averaged 104 in., but last winter we had 128 in., that is to say, nearly 11 ft. When it is said that our sweepers were sent out for the first time on Nov. 23 and that they were out sixty-five times afterward, it will tell you that the lot of a tramway man is not what you may call a very pleasant one in the winter. On the other hand, looked upon from the right angle, there is a lot of real sport in it, as there is in fighting snow the same ambition to win as there is in playing hockey or lacrosse.

In the early days of our industry, when street cars were in the experimental stage and all other conditions somewhat similar, all we could do was to do our best. When beaten by the Storm King, the public had to wait or walk, but today the public demands not only that we keep our cars running but that we run them on time, and in spite of our modern equipment and thorough organization we are kept on our tip-toes all the time and we are taxed to the utmost to meet the ever changing conditions that arise. Every snowstorm is different from the previous one; temperature, wind, kind of snow and road conditions are all factors, which never combine in the same way and keep all of us on the *qui vive* to overcome their different combinations.

From November until the end of March there is not a moment that we can safely say "We are out of danger."

HOW THE EQUIPMENT IS MADE UP

Our snow-fighting battery consists of forty sweepers, six plows, twelve levelers and ten other pieces of apparatus of different styles, and most of them are of the very latest type.

Our sweepers have two rotating brooms and two wings, a large one on the right side and a small one on the left side. The large one opens a driveway for

the rigs and the small one removes the snow from the center of the tracks. Most of our sweepers are of the single truck type, but during the last few years we have had a number of sweepers of the heavy type built for the steep hills with which our city has been blessed by nature.

Our plows are of the railroad rotary type and are used on the suburban lines through the open country.

During or immediately after a snow storm our tracks are the cleanest part of the road, and all vehicles and especially autos immediately take to them, naturally to the detriment of our car service. In consequence we have had designed the levelers or wing cars to open the road alongside of our tracks wide enough to allow rigs and automobiles a safe roadway clear of our cars. Our sweeper wings push back the snow from our tracks for about 6 ft. and these levelers—which are some of our freight cars equipped with heavy concave iron wings, pushed out by mechanism—push back the snow left by our sweepers further away and leave clear a driveway of some 9 ft. for the traffic.

HOW THE ORGANIZATION IS MADE UP

Next in importance to good equipment comes the need of making the best possible use of it, and long before the winter comes, our organization is complete and plans have been carefully thought out and drawn up. The first actual move towards the success of the winter's campaign takes place at the beginning of November each year, when a meeting of all men in charge of the machines is called and addressed by the superintendent.

This address takes the form of a friendly, heart to heart talk, which further cements the *esprit de corps*. Special care is taken to impress on each man in charge that he must feel proud to be called to act as lieutenant in this fight and that he would not have been called if it was not felt that he was the best man that could be got. Suggestions are offered by the men and considered, and after further amicable testimony of confidence, we separate, each feeling that he is an essential spoke in the wheel, and each anxiously waiting the moment that he will be able to show what he can do.

A motorman in charge and an assistant motorman in charge are appointed for each sweeper and leveler at the beginning of a winter, and these men keep their own sweepers during the entire winter, subject, of course, to the proper performance of their duty. The idea of this is that if a man is in charge of one special sweeper all the time, he will soon learn its strength and its weakness. Consequently, we get better work from both the man and the sweeper than if he worked on one sweeper today and on another one tomorrow.

To each man in charge of a sweeper is given a

*Abstract of an address given at meeting of Montreal Publicity Association, Montreal, April 24, 1918.

certain route to cover, and he remains on this sweeper route each time he goes out and thus gets to know its difficulties and danger points and how best to overcome them. I might say that from this system a keen rivalry among the different crews has grown up, each claiming that his sweeper is the best and his route kept the cleanest. The routes laid out for the sweepers are separate and distinct from the ordinary car routes, the whole territory being divided among the four operating divisions of the company and the sweeper routes assigned to each being those which can be handled to best advantage. Each piece of apparatus is also assigned to a particular route.

HOW THE ROUTES ARE ARRANGED

As far as possible, the routes are arranged so that each can be completely covered by its sweeper in from forty-five minutes to an hour. The routes are also arranged so as to have one central converging point for three to four sweepers, the idea being that when help is needed, it can be quickly sent by diverting the sweeper from another route when it reaches this spot. Large blueprints of these routes are posted in the superintendent's office at snow headquarters and at each station. Smaller blueprints are also posted in each piece of apparatus, giving the detailed route of that particular sweeper or leveler.

Thus we have the routes specially defined, sweepers designated for each route, and a man in charge who is fully aware of the danger of that route and who understands his sweeper and knows how to handle it so as to obtain the best results. Hence, when the order is given from snow headquarters to pull out, there is no confusion, and no valuable time lost in asking questions. Each man knows where to go and what to do, and he simply goes ahead and does it.

The best recording barometers that science has so far produced are installed in the snow headquarters downtown as well as in the home of the man in command, and the question, "*Will it snow to-night?*" is one which he asks himself when looking at the barometer and before going to bed.

The first storm of the season is always the one awaited with the most anxiety. Sweepers have not been in use for eight or nine months, the men are more or less rusty at the first run out, switchman are not available, and all this, added to the fact that the first storm always comes when least expected, makes the men in charge do a lot of anxious thinking.

When it does come we send out the 200 odd men to man all the machines, even if they are not all absolutely needed, so as to give each machine a real test and see whether they are all ready for their winter's work. It has always been our ambition to pull out our whole snow battery in less than an hour and when this is done and the order given in time, it takes quite a blizzard to stop the movement of the cars here.

There is little worry as regards men attached to daylight snow storms. The real worry begins between midnight and 5 o'clock in the morning, and special care has to be taken so as to be able to locate our men on time if snow begins between these hours.

Call boys are held in each station and sent out to get crews as soon as the danger appears, so that all

our sweepers are ready to go out when the first flake begins to fall. Our men generally live around the stations, and as they expect to be called at any moment during the winter, it does not take them long to get dressed and get on the job, especially as each one is anxious to keep his own line better than the other fellow.

The first trouble in snow storms comes at switches and intersections. The snow blocks the switchpoint, and motormen have trouble in opening the switches. That explains the delays at intersections at the beginning of every storm. We have continually some eighty odd men looking after the hills and switches, brushing off the snow and salting the switches and the rails on the hills to keep them soft and clean, but when the storm comes some 200 additional men are rushed to help them so as to keep hills and switches in perfect condition.

Sweeper crews are also provided with good lunches when the need arises. If possible, the sweeper is pulled into a convenient siding and the crew given a good meal at a near-by restaurant. If it is not possible to spare the sweeper off the road for half an hour, cans of coffee and good sandwiches are sent to them.

WHAT HAPPENS AT HEADQUARTERS

Our snow headquarters are established at our central carhouse on Cote Street, where special telephones are in operation and dispatchers are at hand. Here the superintendent takes up his position at the center of the web and directs the movement of his forces.

All orders are issued from this spot and all news is transmitted there, and there is lots of it. Divisional superintendents and inspectors report every hour. Sweeper and leveler crews also report every trip, giving their sweeper number, the place they are reporting from, the ground they have covered and the condition of their road. This means some ninety calls per hour.

All this information is tabulated in such a way that the assistant superintendent in charge at the desk during the snowstorm can tell at a glance the position of each sweeper or leveler. There is a lot of thinking to do and he must be a man having the whole system engraved in his mind, as the number of telephones per minute would not allow time to consult any map. In this way a close check can be kept on the whole system and help can be sent where it is needed, and a sweeper transferred from its own line to another where danger threatens.

Our snow season begins, as I said before, in the month of November and continues right through until St. Patrick's day. The snow in December is soft and comparatively easy to handle, as the cold is not severe, but in January and February our snowstorms live up to their reputation, and when the thermometer acts in conjunction and drops to 20 or 25 deg. below zero, then indeed we have our work to do. In these two months, storms often commence one day and continue all that day and night and sometimes the next day as well, and although the snowfall is scientifically given as 10 or 12 in., this means that the streets are covered with piles of snow 3 or 4 ft. deep.

In storms like these, something more is needed than equipment and plans, and that is men. If your men are of the kind that work only for pay, then the

most complete equipment, the most carefully laid out plans will not pull you through. What you need, and need badly, are men who are real men—men who work not only for their pay but do work such as cannot be paid for in mere money.

Espirit de corps must permeate the whole staff from superintendent down to switchman. Men are wanted whose ideals are so well put by Kipling when he says:

No one shall work for money, no one shall work for fame,
But each for the joy of the working.

Men who answer the call on the jump, who phone headquarters even before they are called, who pull out their sweeper at the beginning of a storm and return it back only when the storm is over, whether it is after twelve or twenty-four or thirty-six hours, and who are indignant when offered relief for a few hours of needful rest. With a staff that starts in with the storm and stays right with it, eating sometimes, sleeping at no time, but fighting at all times, you feel your feet on solid ground and are ready to do your best in the battle with nature's Storm King.

And after the storm, when the last sweeper has been ordered in and your inspectors are phoning in "cars on schedule time," you turn homewards for a much-needed clean up, tired and worn out physically, but your mind at ease, and as you see the streets piled up with snow but with the car track clean and shining in the sun, the cars filled with passengers riding safely and comfortably down to work, you are suddenly filled with a feeling of joy and pride—joy in the doing of a man's work and pride in the organization of which you are the head.

Rotary Snowplow Operates in 18-Ft. Drifts

Levis County Railway, Quebec, Canada, Confronted Yearly with Exceptional Snowfalls, Handles the Traffic Problem with Efficiency

THE Levis County Railway, Levis, Quebec, Canada, operating about 12 miles of track, is located in what is known as the Snow District of Canada. The average snowfall is about 130 in., but during the past year the average was 150 in. Snows began in November and were continuous throughout December, accompanied by extreme cold with no thaws during the cold period, so that the snow accumulated to a great height.

The worst storm of the season, which continued for twenty-four hours and accompanied by very high winds, piled the drifts up 18 ft. on the railway track. Snow slides occurred along the Quebec Bridge division and several houses were completely buried and others shifted from position.

The equipment used to disperse this almost insurmountable barrier to transportation was a 300-hp. rotary plow. This plow, shown in Fig. 1, is equipped on the front with rotary blades which cut the snow. Back of these are rotary paddles which deliver the snow some 15 ft. through a funnel in either side of the plow.

By means of this plow the St. Joseph division was opened and normal operation effected on the first afternoon that the plow was placed in service. During the night the Levis upper town division was opened and on the following morning the plow began work on the 7-mile trip to the Quebec bridge. Immense drifts and snow slides had to be overcome along practically



BUCKING SNOWDRIFTS IN QUEBEC, CANADA

Fig. 1—300-hp. Rotary Plow Operating in 10 ft. of Snow. Fig. 2—Plow Assisted by Shovelers, Operating in 9-ft. Snow Slide. Fig. 3—Plow Hacked Up to Show Depth of Snow. Fig. 4—A Typical Cut Through a Snow Drift After the Rotary Plow Has Completed Its Work.

the entire course and it was on this division that the company photographs were taken. The Levis County Railway supplies the only direct way to the Quebec bridge site, the bridge itself being only a five-minute walk from the terminus of the company, and it was essential that the tracks be cleared with the least possible delay.

Effective Snow Boards for City Service

Detroit Uses Interesting Type of "Drag" Board Suspended Under Rear Platform of Either Single or Double-Truck Cars

THE Detroit United Railway for many years has been using what is called a "drag" board, or snow board, to remove the snow and slush from city car tracks and to throw it to one side of the rail. Details

beam by a pin. This arm maintains the board in a vertical position and at the same time pivots on the pin to allow vertical motion in passing over rough spots in the pavement.

Attached to the board are wrought-iron hinges made of $\frac{3}{8}$ -in. x $3\frac{1}{2}$ -in. stock. From these hinges, as clearly indicated in Fig. 1 and shown in Fig. 2, a heavy drag chain passes back to a clevice. These chains, together with the twisted arm, hold the board in position when the car is moving forward.

A third chain, which is attached to the board by means of an eyebolt and to the end of the car sill by means of a screwbolt, prevents the board, also held in place by the arm, from swinging under the car and trucks when the car is backing up.

Chains suspended from the car sills hook into wrought-iron clips which are made of $\frac{3}{8}$ -in. stock $1\frac{1}{2}$ in. wide and bolted to the drag board. By means of these chains the board may be hooked up 4 in. above the rails and carried in this position when not in service.

Fig. 2 shows the car also equipped with a guard board attached to the right-hand rear vestibule corner post by means

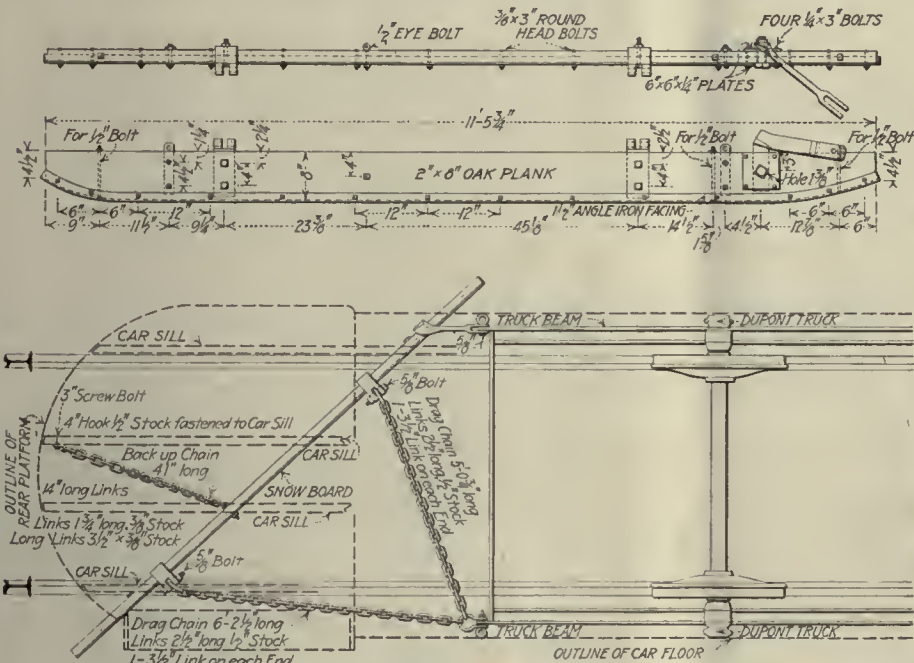


FIG. 1—DETAILS OF CONSTRUCTION AND ATTACHMENT OF SNOW BOARD, DETROIT UNITED RAILWAY. FIG. 2—SNOW BOARD IN OPERATION ON DOUBLE-TRUCK CAR

of the construction of the board and of its attachment to the car are shown in Fig. 1.

The boards are made of 2-in. oak plank 8 in. wide with a steel heel of $1\frac{1}{2}$ -in. angle iron. They are $11\frac{1}{2}$ ft. long and slope up at the end to prevent striking any obstruction outside the rail, such as high spots in the pavement.

The method used in applying these to the rear end of the car shown in Fig. 1 is for a single-truck car, but the application to double-truck equipment is the same except that the drag chains are fastened to the car body instead of to the truck. The double-truck attachment is quite clearly illustrated in Fig. 2.

Referring again to Fig. 1, the reader will be able to note the location of the following attachments. A wrought-iron arm 1 in. x $2\frac{1}{2}$ in. bent at a 90-deg. angle is attached to the board. At the point of the angle, at the top of the board, this brace is twisted 90 deg. so that it extends back with the narrow edge vertical. The end is pronged and fastened to the truck

of hooks. This is to prevent passengers, after alighting, from being tripped by the snow board, which projects a little beyond the body of the car.

When immediate service of the boards is not anticipated they are stored at the various carhouses on racks adjacent to the loop where the cars turn. Here they are handy and can be attached to the cars in a very few minutes by simply placing two pins, one for the drag chains and one for the arm bracket, in position, and hooking in place the back-up and suspending chains. All cars are equipped to carry the snow boards, but as a general thing it is necessary to place them on only every fourth, fifth or sixth car, depending upon the severity of the storm. These boards have proved of great value to the United Railway in keeping city tracks clear and have, it is believed, often made unnecessary the use of heavier snow-fighting equipment and avoided many delays in schedules and possibly even more serious tie-ups. The first cost is small, the maintenance negligible, and the service rendered inestimable.



CUTS THROUGH SNOW DRIFTS, CHICAGO, SOUTH BEND & NORTHERN INDIANA RAILWAY

Fighting Snow on the Interurban

Middle West Roads Had Unusual Experiences Last Winter

SOME idea of the difficulties which beset electric railways during last winter, particularly in the Middle West, can be inferred from the accompanying views of snow scenes on two roads in northern Indiana, where the winter was the most severe that has been experienced in that vicinity for many years. The snow was unusually heavy, and because the temperature was so low became packed too hard for any equipment to handle it satisfactorily. Much damage was also done to equipment, as it was not uncommon for the armature shafts to be twisted off while the drifts were being fought. While the winter of 1917-1918 was unusually severe the experiences suggested by the photographs are worthy of record.

The Chicago, South Bend & Northern Indiana Railway, which has one large rotary plow and four smaller plows, besides a number of sweepers, equipped also many passenger and freight cars with plows. This company was unable to give normal service on all divisions until Feb. 9, following the first severe storm on Jan. 11.

The entire length of the line was buried under drifts ranging from 2 ft. to 16 ft. deep, and from 400 ft. to 2000 ft. long. On account of the equipment being tied up it became necessary to hire men to clear the tracks by shoveling. W. F. Carr, engineer maintenance of way, was killed by the overturning of a plow of which he was in charge when it struck a drift just after the crew had rescued passengers in a car which had been stalled for several hours.

Storage of Bituminous Coal

Limitations as to Permissible Amounts Set by Administrators

AT A meeting of state fuel administrators held in Washington on Aug. 20 it was decided to be necessary to limit the amount of coal storage that industrial plants will be allowed to accumulate and carry on hand. Coal in excess of that required for current operation will be delivered to plants not on the preference list only when it is not in demand for use before April 1, 1919, by consumers on that list, which includes public utilities.

The number of maximum days storage which will be allowed to public utilities in a number of the states are as follows: Maine, 120; Massachusetts, Vermont, New Hampshire, northern New York, 90; Connecticut and Rhode Island, 75; southern New York, New Jersey, Delaware, eastern Pennsylvania, 30; Maryland, District of Columbia, Virginia, North Carolina, South Carolina, Georgia, Florida, western Ohio, 30; western Pennsylvania, West Virginia, eastern Kentucky, eastern Ohio, 30; lower Michigan, 90. It is understood that particular cases may require special treatment.

Any company which is permitted under the zoning regulations, now or hereafter in force, to obtain coal from Illinois, Indiana or western Kentucky, or from mines west of the Mississippi River, may retain such reserve stock of coal as it shall have on the effective date of the ruling, on condition that such company or concern shall thereafter use screenings or mine run only for its current necessities, and shall obtain such screenings or mine run for its use only from such last-mentioned fields.



SNOW-FIGHTING SCENES ON THE CHICAGO, LAKE SHORE & SOUTH BEND RAILWAY

How Zone Fares Are Collected

Resume of European and American Practice, Showing the Methods Adopted to Facilitate Collecting of Fares and Checking of Distance Traveled

MOST railway managers will readily admit that the zone system of fares, in which the fares charged have some proportion to the distance traveled, is a more logical basis of charge than the flat fare. The principal objection urged against it in the past has been the difficulty of obtaining a correct accounting between conductors and the company and of checking the riders to see that they do not ride more than the distance paid for. The great interest now manifested in the subject, however, prompts a brief comparison of the systems now in use for fare collections and registration.

Most of the European tramways and bus lines use the zone system of fares. The fares are collected by a conductor who passes through the car, as was formerly the custom in this country. The passenger tells how far he wants to go, and after paying his fare he receives from the conductor a ticket punched or marked by tear or pencil to indicate the stated point of destination. These fare receipts, two of which are reproduced herewith, bear a serial number and also may have separate figures and initial letters to identify the conductor or route still more readily. The more elaborate do not look unlike American transfers. Sometimes the color of the ticket differentiates the inbound and outbound trips. Sometimes, too, the ticket specifies the hours of the day, but usually not. Every ticket says that it is non-transferable and good for that particular ride only.

The passenger retains the receipt during his trip and must keep it within view, so that it can be readily examined by an inspector boarding the car at any time. When the passenger leaves the car, he is not required to give up the ticket but may take it with him or throw it away.

The system on the whole is crude, and it seems to the average American as if it could easily be beaten by both passengers and employees. For example, there is little or no safeguard against the issuance of an old ticket by a conductor except that he is supposed to tear each ticket when issued from a roll or pad, and no safeguard against the use of an old ticket or over-riding by a passenger except the vigilance of the conductor and the inspector. It should be remembered, however, that prosecution in most European countries in the case of either passenger or conductor who attempts to defraud the company is likely to be much more swift and sure than in America.

From the American point of view, however, the system, even if perfect as regards proof against fraud, possesses two serious objections. One is that the conductor has to collect the fares by passing through the car. The second objection is even more important. It

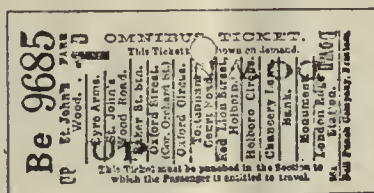
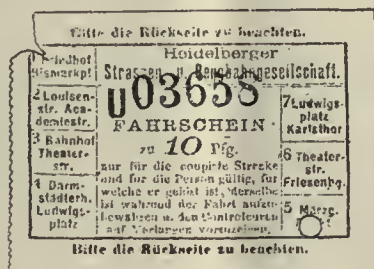
is that inspectors have to be used to check up passengers. These inspectors are supposed to board and pass through a car quickly, but it would take much longer for them to get through the larger cars in America, and such a task would be practically impossible during the rush hours. Moreover, the additional labor charge would be prohibitory. If the zone system were applied in this country, it would seem that one improvement might be for the passengers, when leaving the car, to drop their tickets into a box. These could be subsequently collected by some employee other than the conductor and then checked by their serial and other numbers.

The Milwaukee zone system was originally designed for operation with both pay-as-you-enter and pay-as-you-leave cars. Passengers inbound from suburban zones, when riding into the city single-fare area, were to be required to pay the entire fare upon boarding the car. They would not secure receipts but would receive transfers in case they wished to ride on some transfer line in the city. Passengers who boarded a car in the suburban zone, wishing to ride to some other suburban point on the same line and not through or into the single-fare area, would pay the entire fare and receive a receipt. This receipt they would then be required to surrender upon leaving the car.

Passengers who boarded the car inside the single-fare area to ride into some suburban zone were to be required to pay the city fare upon boarding the car. When they left the car the additional zone fares corresponding to the one or more zones across and into which they had traveled since leaving the single fare area were to be collected. Passengers boarding outbound cars in a suburban zone to ride into some other zone were to be required to pay the entire fare upon boarding the car. Like passengers inbound and traveling under the same conditions, they were to receive receipts which they would surrender upon leaving the car.

Thus it would appear, under this plan, that all outbound passengers would be required either to pay a fare upon leaving the car or present a receipt. The receipt contemplated under this plan naturally would become valuable to the passenger to whom it was given, as he would either have to surrender it when he left the car or be required to pay additional money.

Presumably the reasons why the system just described was not put into effect in Milwaukee were that it involved a change from the old method of passing the fare box through the car at zone points, and that it required a different plan for paying for an inbound ride and an outbound ride. It also required a different plan of payment for passengers in or out from the central zone and those simply from one suburban zone to another

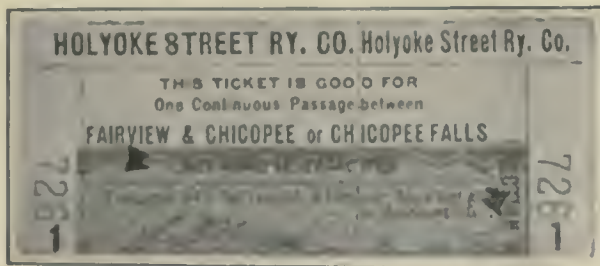


FARE RECEIPTS USED ABROAD

or within one suburban zone. On the other hand, all passengers would pay on the platform. The plan actually put in use in Milwaukee sacrifices this last advantage, though possibly it is more simple for the passenger. Under both plans the passenger whose ride begins and ends within one zone pays only 5 cents, whether that zone is the central zone or one of the suburban zones.

PLAN NOW USED IN MILWAUKEE

Under the existing practice in Milwaukee passengers who originate in the suburban territory and are inbound pay the entire suburban and city fare when they enter the cars. Those who plan to ride through only one or two zones signify their intention to this effect to the conductor and pay only the fare charged for such a ride. When the central zone is reached, the conductor glances through his car to see whether there are any passengers in it who have not paid to ride into the



TWO-ZONE TICKET USED IN HOLYOKE

central zone. As there are only a few in any case who do not pay the full fare in advance, he can easily remember them. He then passes through the car and collects the additional fares with a portable fare box.

On outbound cars passengers who board the car within the city single-fare area pay only the city fare. When each zone point is reached the conductor goes through the car with a portable fare box and collects the zone fare either in tickets or coins. An exception to this rule is the plan practiced on the South Milwaukee line, where on account of congestion the entire fare is collected upon boarding.

A 5-cent initial fare is charged which is good within the central zone or good for a ride wholly within one of the suburban zones or from one suburban zone to another. The fare to ride through each additional zone is 2 cents.

Although in many respects satisfactory, the management of the Milwaukee Electric Railway & Light Company does not consider the present plan, by which the conductor passes through the car and collects fares in a portable fare box, as a final solution. It regards the present method as temporary and subject to supersession in favor of the plan as originally developed. It believes that the conductor should, if possible, remain on the platform, and if any fare receipts or coins are to be collected they should be deposited in a stationary box under supervision of either the motorman or the conductor. Neither should have access to the box.

PITTSBURGH HAS PAY-ENTER-PAY-LEAVE

In Pittsburgh there are only two zones in the city proper, the fare being 5 cents for a ride entirely within the central zone and 7 cents for a ride between any point

within the central zone and any point in the outer zone, or between two points in the outer zone. The cars are operated as pay-as-you-enter on the inbound trip and pay-as-you-leave on the outbound trip. On an outbound trip those who leave before the single-fare zone boundary is crossed pay 5 cents, and those who leave after the boundary is crossed pay 7 cents. Conversely, with an inbound car, those who enter the car at the suburban zone pay 7 cents and those who enter after the zone boundary is crossed pay 5 cents. There has been no difficulty in collecting 7-cent fares from passengers as they leave the car.

This plan, of course, requires that the rate of fare for any passenger who begins or ends his trip within the suburban zone shall be 7 cents, regardless of whether he travels through parts of two zones or only through a part of the suburban zone. The company believes such a fare justified for two reasons. First, the average length of ride per passenger is greater in the 7-cent area than in the 5-cent area. Second, the number of passengers on each car in the 7-cent area is less than that in the 5-cent area, so that the cost per passenger is very much greater in the 7-cent than in the 5-cent area. Moreover, even if it were logical to base the charge on the distance ridden alone it would not be practicable to collect the fares on any such basis in a large city.

Two registers are used, one for the 7-cent fares and one for the 5-cent fares. Only one of these can be operated at a time, and when the car is passing from one fare area to the other the conductor has to go forward in the car and change certain mechanisms, so that the operation would be noticeable to the passengers if performed at other than the proper time. Thus both error and dishonesty are eliminated. Eight of the 7-cent tickets are being sold for 55 cents, and these tickets are rung up on the 7-cent register. All fares are collected on the platform, but fare boxes are not used.

THE PROVIDENCE METAL-TICKET SYSTEM

In Providence there are for the city cars one central zone and two suburban zones, the fares being 5 cents for a ride wholly within any zone and 2 cents more for each additional zone. For a number of years the Rooke register has been used for city fare collection, the conductor passing through the car and collecting the fares after the passengers are seated. This plan is still followed except that the conductor collects an additional 2 cents whenever the car passes a zone boundary.

This 2-cent fare is collected by means of a 2-cent metal ticket which the conductor sells to the passenger and immediately receives back through his Rooke register. This plan was considered better than to have the passenger deposit two 1-cent pieces in the register, as that would have required two registrations instead of one. It was also considered better than to have the passenger pass 1 cent through the register and hand the other to the conductor, because such a plan would cause an exception to the rule of the company that all money must pass through the Rooke register.

On inbound trips, inasmuch as the destination of practically all passengers is the central 5-cent zone, through fare of either 7 cents or 9 cents is collected on the first collection. Moreover, on outbound trips on lines having two 2-cent zones, the fare for both is collected at the same time.

Further particulars of the Providence city and inter-urban system of fare collection will be found in the *ELECTRIC RAILWAY JOURNAL* of July 13, pages 65 and 66.

HOLYOKE TWO-ZONE TICKETS

On the Holyoke Street Railway the fares are 5 cents a zone if paid in cash. If a traveler buys tickets, he can ride through into two zones for 6½ cents or 7½ cents, depending on the distance or the direction. A typical two-zone ticket is shown on page 374.

This pasteboard ticket is partially perforated so as to be torn in two easily when the fare is collected. The conductor retains one half and the passenger keeps the other, to be collected when the second zone is reached. Both parts have the same serial number. The ticket is registered only once, namely, when the first half of the ticket is collected. The conductor cancels both parts of the ticket with his punch, and at the end of his trip turns in both.

BAY STATE PRACTICE

The fare system of the Bay State Street Railway, as described on page 1210 of the issue of this paper for June 22, is somewhat complicated owing to the variety of fares changed, including "off-peak" tickets. In general, however, there are not more than two zones in any one city, and the plan of pay-as-you-enter inbound and pay-as-you-leave outbound, used in Pittsburgh, is followed. On the suburban lines a duplex ticket is used, the passenger retaining his half until he leaves the car.

"Keep the Home Wheels Turning"

IN ITS campaign for a higher fare, a rehearing on which was opened on Aug. 29, the Public Service Railway, Newark, N. J., is using the epigram "Keep the Home Wheels Turning" from the running headline of recent issues of the *ELECTRIC RAILWAY JOURNAL*. Dasher signs like that illustrated are being carried on the cars, in order to impress upon the people of New Jersey

"Keep the
Home Wheels
Turning"

DASHER POSTER IN USE THIS WEEK ON CARS OF
PUBLIC SERVICE RAILWAY

the importance of supporting the local electric railway service as one means of helping to win the war.

In an address before the Newark Board of Trade, delivered on Aug. 21, Thomas N. McCarter, president Public Service Railway, used the phrase as the title of his remarks, and also used it by way of illustration. He said, in part: "The *ELECTRIC RAILWAY JOURNAL*, which is one of the official organs of the industry in

the country, in its issue of last Saturday had printed across the top of every other page in large type the epigram "Keep the Home Wheels Turning." That is the best statement of the whole problem I have seen. That is what this application is for. It isn't whether I, my brother, or any other investor in any of these enterprises, gets his money or gets his dividend in his pocket. It is whether the financial status of this outfit can be maintained so that we can "Keep the home wheels turning."

The Competition Between Safety Car and Jitney

Reduction of Man-Power Because of War Needs and Publicity on Financial Conditions Remove Objections to One-Man Cars

BY M. B. LAMBERT

Assistant Manager Railway Department, Westinghouse Electric & Manufacturing Company

THE safety car has come to stay. Its practicability and economy have been proved in numerous parts of the country. War conditions have contributed much to its popularity. The average citizen will admit that under present conditions it is a waste of man-power to use two able-bodied men on each street car, whereas he formerly looked upon the one-man car as a measure toward reducing costs and increasing dividends at the expense of the car rider.

The publicity that has been given to the financial conditions of the electric railways has also borne fruit. Many people now understand that the electric railways have not been coining money but, instead, have been rapidly approaching and are now on the verge of bankruptcy and must have relief.

A great number of men who have given serious thought to the electric railway problem say there are three possible consummations: (1) Financial breakdown followed by municipal or state operation. (2) Company ownership and operation regulated by public commissions, with a fair return on the investment guaranteed by the state. (3) Company ownership as at present, securing a fair return on the investment through the usual business methods of providing reasonable service at a reasonable price.

The last plan is, of course, the best if it is possible of accomplishment. The great difficulty lies in the fact that very few electric railway companies have an organization capable of conducting business publicity. It is something that cannot be accomplished in a few months. It requires a year or so of honest, straightforward publicity work with real honest effort to provide good service. Furthermore, it means that this sort of activity must be kept up if continued progress is expected.

It is also true that a great deal of publicity work must be done in order to make the second plan work out successfully. The people, as a whole, will not be content with a guaranteed return on the investment unless they believe they get a good service for the price paid.

The safety car looms up on the horizon as a solution of a part of our city transportation problems and offers an opportunity to numerous companies to provide rapid service at frequent intervals at low cost. It is no longer an experiment. It has been tried out and has shown wonderful results on a great many properties,

not only in economy but also in satisfactory operation and service to the people.

The operation of the jitneys proved conclusively that most people tolerated the discomfort of the crowded jitney because it made faster schedules and vice versa, where the one-man safety cars make faster schedules than the jitneys, the people have shown they prefer to ride on the safety cars. In other words, experience has shown that the people want fast service at frequent intervals. The introduction of the skip stop has made faster schedules possible. There remains only to provide sufficiently frequent service at a reasonably low fare to make the service attractive and pay an adequate return on the investment. With this accomplished, no further competition may be expected from jitneys and, above all, in this plan which the safety car has made possible there seems to lie a solution for many electric railway properties.

The wonderful growth in the popularity of the safety cars, with one-man operation, like most other things that have benefited humanity, is to a large extent due to a man or group of men who had the courage of their convictions.

The American Car Company had faith in Birney's car, and placed orders for large numbers for stock. The sales have exceeded all expectations, notwithstanding the general curtailments due to war conditions. The reason for this is the safety car is solving the problem on many street railway properties. The scheme is economically sound; hence, we may look more and more to safety cars in the future.

San Francisco Buses a Costly Accommodation

TO GIVE service to outlying parts of the city, the San Francisco Municipal Railway last year purchased five White buses and rented three others, all of nineteen-passenger seating capacity. Since May two of the rented buses have been discontinued in order to reduce the losses. With eight buses, one was used as a spare; with six buses all are in service. The reduction was secured by combining Routes 3 and 4, the buses going up one street and returning down another to connect with the "K" or Twin Peaks Tunnel line. The traffic data concerning each line follows:

Route 1—Two buses giving free transfer to and from the "A" line for twelve-minute headway service across Golden Gate Park. Maximum ride for 5 cents, 4.8 miles in car and 2.08 miles in bus. Total 6.88 miles.

Route 2—One bus giving free transfer to and from the "B" line along Great Highway (ocean shore) from Cabrillo to Kirkham streets on fifteen-minute headway. Maximum ride for 5 cents, 7.06 miles in car and 1.12 miles in bus. Total 8.18 miles.

Routes 3 and 4—Three buses (instead of four regulars) or Ingleside and Parkside routes combined from Ocean and Phelan Avenues to Thirty-third Avenue and Tarraval Street on ten-minute headway, connecting with "K" line. Maximum ride for 5 cents 6.04 miles in car, 1.70 miles in bus. Total 7.74 miles.

The average schedule speed of the municipal cars including the congested sections is 9.4 m.p.h.; of the buses, 12.5 m.p.h. These speeds include layovers.

Routes 1 and 2 reach sections not accessible by trolley car. Routes 3 and 4, however, parallel lines of the United Railroads via the Twin Peaks tunnel. The municipal cars reach the Ingleside transfer point in thirty minutes compared with forty-nine minutes on the United

TABLE 1—PASSENGER TRAFFIC CARRIED ON SAN FRANCISCO MUNICIPAL BUS LINES, APRIL, 1918

Line	5 Cents	Tickets		Transfers	Free	Total
		Q.M.	School			
No. 1	19,190	1	779	14,654	32	34,656
No. 2	7,579		116	6,649	2	14,346
Nos. 3 and 4 combined	26,273	1	595	25,182	33	52,089
						101,091

NOTE.—During April, the total traffic on line "A" was 632,664; line "B," 754,245; line "K," 165,741, a total of 1,552,650.

TABLE II—STATEMENT OF BUS LINE OPERATION, SAN FRANCISCO MUNICIPAL RAILWAY, APRIL, 1918

Receipts:		
Route No. 1		\$959.90
Route No. 2		378.95
Routes Nos. 3 and 4 combined		1,332.25
Total receipts		\$2,651.10
Repairs to buses owned, exclusive of \$749.13 for tires which are charged on mileage basis		400.53
Conductor-chauffeur of buses owned		1,172.15
Garage expense of buses owned		973.77
Rental of buses		747.29
Conductors, chauffeurs, buses rented		566.05
		\$4,607.08
Operating loss		\$1,955.98
Reserves:		
Depreciation (18 per cent. of receipts)		\$477.20
Compensation insurance (\$2.39 on \$1,738.20)		41.54
Total reserves		\$518.74
Gross excess of expenses over receipts exclusive of tires		\$1,727.43
Revenue Credits:		
Two quartermaster's tickets 10 cents, 1,490 school tickets \$37.25 and 46,485 local transfers, \$1,162.13		\$1,199.48
Net excess of expenses over receipts, exclusive of tires		\$527.95*
Tire Expense:		
32,645 miles at 5 cents per mile (estimated)		\$1,632.25
Net loss for April, 1918		\$2,160.20
Average net loss per diem		72.01
Bus Mileage, April, 32,645 Miles		
Receipts per bus-mile in cents		0.81
Operating expenses per bus-mile, except tires and reserves		0.118
Operating loss per bus-mile, except tires and reserves		0.037
Gross excess of expense per bus-mile, except tires and reserves		0.053
Net excess of expense per bus-mile, except tires and reserves		0.016
Net loss per bus-mile, tire expense included		*0.066

* After crediting bus line with proportionate transfers and tickets.

Railroads. This fact, however, does not invalidate the contention that a duplication of investment could have been avoided if both interests could have agreed on a car-to-car transfer system.

The degree of necessity for the service on the different routes may be gaged by a comparison of the car and bus passengers on the linked routes. According to Table I herewith, Route 1 in April had 34,656 passengers compared with 632,664 passengers on line "A," a ratio of 0.054:1; Route 2 had 14,346 passengers compared with 754,245 passengers on line "B," a ratio of 0.019:1; Routes 3 and 4 combined, 52,089 passengers compared with 165,741 passengers on line "K," a ratio of 0.31:1. It will be seen, therefore, that the bus travel is significant only on the thinly-patronized Twin Peaks tunnel line because the latter has so many through riders. It is true that the Twin Peaks tunnel was built by local assessments, but the running expense of operation is carried by the Municipal Railway.

Table II, operating costs for April, shows that the bus receipts were only \$2,651.10. Against this were charged \$3,859.79 for operation and repairs, \$1,632.25 for tires (5 cents per mile), \$518.74 for depreciation and workmen's compensation insurance. After allowance of a credit of \$1,199.48 for tickets and transfers, the net loss for April's 32,645 miles was \$2,160.20. In other words, each of the 101,191 bus riders received a gift of 2.1 cents from the city every month aside from the fact that they were also the riders who averaged the maximum trolley haul! The net loss per bus-mile was 0.66 cent.

Labor and the Electric Railways

Of Three Factors in Railway Operation, Employees, Public and Investor; Employees Come First—Their Co-operation Must Be Secured and the Public Be Convinced that Good Service Demands Fair Pay

BY BRITTON I. BUDD

President Chicago Elevated Lines and Chicago, North Shore & Milwaukee Railroad

THE electric railways of the United States are to-day facing the most serious problems in their history. Conditions brought about by the steadily increasing costs of operation, due to the enormously advanced prices of materials and labor, with revenues limited by national, state and municipal regulating authorities, call for clear thinking and sane acting, if receiverships and industrial chaos are to be averted. Owners of electric railways must look forward, not backward. The problems confronting them must be met and solved in the light of present day knowledge and understanding, rather than by the experience of the past. Especially does this apply in dealing with labor problems, for methods which might have been applicable even ten years ago are to-day obsolete and out of place.

THE EMPLOYEES, THE PUBLIC AND THE OWNERS

In the operation of electric railways there are three factors to be considered, namely, the employees, the public and the owners of the properties. Each factor is entitled to a fair return on his contribution toward the success of the enterprise, and each must be given consideration in determining what that return shall be. If one of the factors in this equation demands and receives more than its fair share, it must be at the expense of the other two factors, and this presents a condition which calls for an adjustment.

In my classification of the factors I have given the employees first place, because in many ways I feel they are the most important. If employees are reasonably well paid, if they are given the best working conditions which the character of the work will permit, they will be contented and will work and co-operate with the company. Such co-operation makes possible the best service to the public, which means a better return on its investment. If the employees and the public both are satisfied, the owners of the property are more apt to be satisfied, because operation under such conditions will be successful, assuming, of course, that revenues are sufficient to make a reasonable return to all factors.

Let us briefly consider what are the rights of each of the factors in this equation and their relations each to the other.

The National War Labor Board, in laying down certain general principles and policies to govern relations between workers and employers, has said: (1) "The right of all workers, including laborers, to a living wage, is hereby declared." (2) "In fixing wages, minimum rates of pay shall be established which will insure the subsistence of the worker and his family in health and reasonable comfort."

It will be observed that in laying down these gen-

eral principles, the War Labor Board has not considered the financial condition of the employer. The inference is plain that workers are entitled to a living wage, and that the ability of the employer to pay that wage is not the main issue.

The owners of electric railways should face the situation squarely. Demands of employees for increased wages cannot be dismissed on the plea that the company is financially unable to meet them, even though that plea is literally true. Such a plea will satisfy neither the employees nor the public and it behooves the owners of electric railways to face about and seek ways and means of increasing revenues.

RAILWAYS ARE NOT A PHILANTHROPY

At the present time wage demands have been made on many electric railways which if granted would mean utter financial ruin, unless ways are found for increasing revenues. If the electric railways wish to be regarded as eleemosynary institutions and sell transportation at less than cost, the employees cannot be expected to engage in such philanthropic enterprises. The public should not receive goods at less than cost, at the expense of those engaged in producing such goods, and this applies to the investment made by both capital and labor.

The term "living wage," which the War Labor Board has declared each laborer entitled to, is rather a loose term and ambiguous. It would, however, be impossible for any board to define in exact terms what constitutes a living wage. We find one man supporting a family in comfort on a wage which another man similarly situated finds altogether inadequate. A great deal depends also on locality. What might be a fairly adequate wage in one part of the country may not be adequate in some other section.

LABOR MUST BE HELD IN A COMPETITIVE MARKET

The owners of electric railways, however, need not greatly concern themselves on that point. They must be prepared to pay wages relatively as high, all things being considered, as are paid in other industries, or they will not be able to procure the labor necessary to operate their lines. Many already are experiencing difficulty in this direction and the public suffers as a result of the quality of the service. However much we may differ in opinion as to what constitutes a fair rate of pay for employees of electric railways, we can all agree, I believe, that wages that were fair in pre-war times are not fair to-day, because the purchasing power of the dollar has materially decreased. We must recognize that fact and deal with our employees accordingly.

What are the rights of the public in the matter? What attitude should the public assume toward electric railways? The public is entitled to the best service that can be given for the price paid. In this respect the public often is short-sighted as it does not fully appreciate the relation of the service to the fare. It is impossible for any public utility company to give the best service unless it is earning a fair return on its investment. In other words, the character of the service must depend upon the price paid for that service.

Generally speaking, the attitude of the public toward electric railways and other utilities is not a fair one. While demanding more and more in the way of service, the public is unwilling to pay for what it asks and expects. Any suggestion of increasing rates for transportation usually meets with public opposition, regardless of the financial condition of the company. Prices of all other necessities advance, but to-day the price of transportation on many electric lines is actually less than it was ten years ago, although the service given has steadily improved.

WHERE DO THE OWNERS COME IN?

The owners of electric railways are entitled to as square a deal as the other two factors in the equation. They are performing a great public service, for which many times they receive neither credit nor adequate return on their investment. Sometimes, perhaps, they are themselves to blame. Too often in the past the electric railways have taken a position of standing between the public and increased fares. They have met the demands of their employees for increased wages with the assertion that the rate of fare will not warrant any advance in wages, and they have appealed to the public to support them in that position.

This policy has never earned the good will and support of the public, while it has incurred the ill-will of the employees. The owners must adopt a policy of perfect frankness with their partners in the industry. They must first have a good case to present, as most of them have, and then they should see that it is intelligently and frankly presented. They have no right to expect their employees to accept lower wages simply because they are selling their product to the public at too low a price. Instead of flatly opposing reasonable wage demands on the part of their employees, they should bend their energies toward producing higher revenues and, by dealing frankly and openly with their employees and the public, they will have the co-operation of the former and lessen the opposition of the latter.

RATE ADVANCES ARE GENERALLY SLOW

We all realize that it is an extremely difficult and slow proposition for a public utility company to advance rates. The manufacturer engaged in private enterprise meets increased wages or higher costs of materials by advancing the price of his product to the consumer. The burden is easily shifted. Not so with the electric railway company. It must be able to show the various commissions and boards, charged with the regulation of rates, that the increase asked for is justifiable. It is a matter of common knowledge that in some states, boards and commissions in mak-

ing awards frequently are governed by popular sentiment rather than by the actual merits of the case. This makes it all the more necessary for public utilities to be frank and open in their relations with their employees.

Never was there a time as opportune for educational work on the part of electric railways as the present. They are absolutely essential to the successful prosecution of the war. The hundreds of thousands of employees engaged in war industries must be provided with means of transportation to and from their work. The public has grown accustomed to higher costs of every necessity, and the necessity for increasing wages is generally recognized, even if the scarcity of labor did not make such increases imperative in order to hold men in the industry.

ELECTRIC RAILWAYS ARE AN ESSENTIAL INDUSTRY

The importance of the electric railways in these war times is not yet fully appreciated by the public, but there is no one factor probably that is of more importance to the successful prosecution of the war than the electric railways, inasmuch as they serve practically every form of industry engaged in the manufacture of war munitions, ships, etc. In fact they are indispensable and it is most essential that their revenues be sufficient not only to enable them to maintain the best of service, but also to put in improvements and extensions to plants, shipyards, cantonnements, naval stations and other war activities.

The banks, trust companies and insurance companies throughout the nation are large holders of the securities of electric railways, and conditions which would bring about depreciation of these securities would have a serious effect upon the entire financial structure of the country. Government officials realize the importance of the electric lines and have shown a disposition to deal with them fairly. This fact should be emphasized in every possible way, until the truth is forced upon the public mind. When the public is fully enlightened on the seriousness of the situation, the way will be paved for a comprehensive plan which may require national legislation to insure sufficient revenues to do justice to those who have invested their capital in electric railways and to enable the companies to perform the service which is expected of them.

In this campaign of enlightenment the employees of the companies, if fairly treated, will be found ready to co-operate. It is inexcusable to overlook the fact that the employees of the industry are a powerful influence in making public opinion. The question for the industry to determine in these critical times is how much of an effort it is willing to make to break down antagonisms that have existed too long and, in lieu thereof, to enlist the employees' help in working out the complex situation in which the companies find themselves. A way must be found to bring about this result. Although it may not always be possible to comply with all the demands which employees may make, it will be possible to go a considerable distance on the road to solving differences. Not to realize this is to miss completely the signs of the times—the entire drift of the relations between employer and employees—and the inevitable result of every controversy between the two.

Facts Must Be Faced

Messrs. Putnam and Doolittle Set Inquiring Journalist Aright in Regard to Operation in Cleveland

THE public does not understand. This applies both to the fundamental economics of the electric railway industry and to the detailed financial and operating facts in particular localities. Nor is this lack of knowledge confined to the so-called unthinking part of the public. Many an educated and influential citizen either does not realize or misunderstands the present serious conditions of utility operation.

A striking example of this fact is a reply that has been elicited by the open letter of Frank Putnam, of the Milwaukee Electric Railway & Light Company, to Charles E. Elmquist, president National Association of Railway & Utilities Commissioners, reproduced in the *ELECTRIC RAILWAY JOURNAL* of Aug. 17, page 298. The writer of the reply, an experienced journalist in a city in one of the Central States, takes issue with Mr. Putnam's conclusion that the condition of the electric railway industry demands federal relief, and he asks why other cities cannot do what Cleveland has done. He writes that, according to his understanding of the Cleveland situation, the fare at present is 5 cents, the wages are abnormally high, the bond interest and a sinking fund is assured and the stockholders will get 6 per cent on shares for which many paid little or nothing twenty-five to thirty years ago. If Cleveland can do all this "on terrifically watered stock" with a 5-cent fare, to say nothing of the previously existing 3-cent fare, he asks, why cannot other cities do the same?

HOW MR. DOOLITTLE SEES THE CLEVELAND SITUATION

In order to present the facts in the Cleveland case to the journalist and others needing similar information, both Mr. Putnam and F. W. Doolittle have prepared summaries which have been forwarded to the editor. Mr. Doolittle, in an exhaustive statement, has gone into the various pertinent phases of capitalization and operating results. He points out, for example, that in 1910 the stock of the Cleveland Railway, which was then \$26,205,600, was scaled down \$10,530,000. Of this about \$8,250,000 represented accrued depreciation, and about \$2,250,000 was a further reduction to bring the capitalization down to the amount allowed by the appraisal. Subsequent changes in capitalization have taken place under the provisions of the Talyer ordinance. The stock remains near par in spite of decreased earning power of the company, because the city in effect guarantees the 6 per cent return, and its option to purchase the stock of the company under the franchise must be exercised at 110 if at all. Moreover, owing to the scaling down above referred to, the stockholders are securing 6 per cent on only 60 per cent of the shares originally issued, or 3.6 per cent in effect on the par value of the original stock. As for wages, Cleveland is paying rates no higher than those of many other companies.

In general, the reasons why other cities have not been able to show the same results as Cleveland are outlined by Mr. Doolittle as follows:

1. The stock is not watered, but as shown by appraisal the company is under-capitalized by from \$8,000,000 to \$10,000,000, or 25 per cent to 30 per cent.
2. Interest has not been earned and large deficits are shown by the balance sheets of the company.
3. No reserves have been accumulated to insure replacement of worn out property.
4. The city's guaranty has maintained the company's credit and cheapened its cost of capital.
5. Operation is cheap in Cleveland as compared with other cities for these reasons:
 - a.—All lines terminate in the center of the city, minimizing dead and low revenue car mileage but increasing the use of transfers, for which an extra charge is made.
 - b.—The designated stop (skip-stop) system has been in effect since 1912, saving power and reducing wages per car mile because of the increased speed of cars.
 - c.—Owing to designated stops, wide streets and co-operation of traffic police, the average speed of Cleveland street cars is 2 to 3 miles per hour higher than that of street cars in other comparable cities, enabling a given number of Cleveland street cars to transport a larger number of passengers within a stated time limit than a like number of cars in other cities.
 - d.—Low accident hazard and consequent relatively small bill for injuries and accidents, owing to designated stops.
 - e.—High percentage of trail car operation with increased headways but decreased cost of platform labor.
 - f.—No line extensions unless immediately profitable.
 - g.—Minimum expense for constructing pavement, as compared with that laid on electric railway systems in other cities of Cleveland's class.
 - h.—Extensive use of short routing—that is, turning cars back before they reach the end of the line—to economize on car miles and car hours.
 - i.—Minimum tax burdens, as compared with electric railways in other cities of Cleveland's class.
 - j.—Standards of service much below those usually prescribed by regulating bodies.

All these things, Mr. Doolittle says, spell economy and represent savings growing out of co-operation between the various departments of the city government and the company.

MR. PUTNAM'S SUMMARY

The substantial facts of the Cleveland situation appear to Mr. Putnam to be as follows:

1. Cleveland's cheap car fares enabled those who bought them to ride for less than the actual cost of carrying them.
2. This deficit was covered partly by confiscation of a substantial percentage of actual investment, and partly by failure under city control to provide out of earnings for the replacement of worn-out and abandoned equipment.
3. This discarded equipment must now or hereafter be paid for by the Cleveland public in fares as much above normal for their period as the so-called 3-cent fare was below normal for its period. Car riders of to-day and to-morrow must make good the losses on the joy riding done by car riders of yesterday.
4. Public control has resulted in "watering" the company's scaled-down reorganization stock (by failing to replace worn out equipment), to the extent of \$2,612,000, or about the same amount that the original stock was found to be "watered." On the assumption that the guaranty of 6 per cent yearly return on the investors' shares of the scaled-down stock was meant to represent only a fair rental for the use of their money engaged in public service, and that it was not meant to apply on the purchase by the city of the stock, the city it would appear must presently restore the balance between plant value and outstanding securities in one of these ways:
 - a.—By confiscating stock of the company to the amount of \$2,612,000—requiring that it be canceled and withdrawn; or
 - b.—By authorizing car fares high enough to cover current operating interest and replacement cost, plus a percentage sufficient within a reasonable time to replace the wornout and abandoned equipment for whose replacement no provision was made during the low-fare period.

Mr. Putnam reiterates the outstanding facts in regard to the whole electric railway industry in this way:

1. Except subways financed with public credit, in one or two of the larger cities, new construction and purchase of additional equipment has ceased.

2. The railways are wearing out and for want of earnings at present fares to make repairs and replacements are declining in efficiency.

3. The failure of state regulation to assure a regular yearly fair interest return on legitimate investment, and to assure maintenance of the property in good condition, has made it next to impossible for electric railways to induce the public to invest its savings in the business—even though all new securities bear the approval of public service commissions.

4. The public, as dependent on adequate good street car service as it is on adequate good water supply for living in cities, and misled by newspapers and politicians constantly telling it about past electric railway sins instead of about present electric railway needs, is dangerously indifferent or openly hostile to every proposition to give the railways terms on which they can live and serve.

The radical newspapers, Mr. Putnam believes, are chiefly responsible for public ignorance of what is being done to their urban transportation systems, and it is up to the real newspapers to get and publish the new state of facts. In Mr. Putnam's words, this new state is:

"Yesterday in the electric railway business was the day of the franchise sellers and buyers, security promoters and sellers.

"To-day is the day of the trained engineers, trying to make \$1 of street car earnings do the work of \$2, and slowly learning how to get the needs of the business across to the public.

"To-morrow is either to be the day of the merchant in this business, selling good service at a fair price with popular satisfaction by modern merchandising methods, or it is to be the day of municipal or of state operation under either public ownership or management by trustees in the public interest.

"Whatever is to come to-morrow, communities that lynch their street car systems to-day might as wisely dynamite their water supply systems."

An Effective Home-Made Track Grinder

BY C. L. CARTER

Superintendent and Chief Engineer Charlottesville & Albemarle Railway, Charlottesville, Va.

A TRACK GRINDER made from old material in the shops of the Charlottesville & Albemarle Railway



TRACK GRINDER READY FOR SERVICE

has proved of great assistance in making track repairs. This consists of a framework of old rails, to connect the wheels and axles, on which is mounted a 5-hp. 500-volt motor. The motor is belted to the emery-wheel shaft. A gear is mounted on one of the wheels which meshes with a pinion on a shaft extending across the frame of the grinder. A steering wheel from an old automobile is attached to the end of this shaft and by turning this the girder is moved back and forth over the joint. A tool box is mounted on the opposite end of the grinder and under this a circuit of five lamps is installed to illuminate the joint when the work is being done at night. With this grinder and an Indianapolis welder, four men can, in a single night, build up and grind fifty joints, some of which are more than $\frac{1}{2}$ in. low.

Chicago Surface Lines Print 4,000,000 Transfers a Day

Printing Department of This System Has Recently Been Enlarged and New Machinery Installed to Meet the Increasing Requirements

THE Chicago Surface Lines handle more transfer passengers than any other street railway system in the world. The task of providing transfers which confronts the management is, therefore, no small one. Adequately to meet the growing demand for transfers a new Meisel rotary printing press was added recently to the equipment at the South Shore shops. The new press even when running below normal speed, 326 r.p.m. shaft speed, is more than able to take care of the transfer requirements. At low speed it turns out 132 sheets per minute, or 7920 per hour. The next higher speed calls for 8400 sheets per hour. Each sheet has the impressions for ninety-six transfers, and ten sheets are accumulated on the cylinder, delivered at once and jogged into place. The present output is at the rate of 43,000 sheets, or 4,128,000 transfers per day.

The general plan of the printing room, which is about 88 ft. long and 46 ft. wide, is indicated by the accompanying engraving giving a bird's-eye view of the plant.

FROM THE ROLL TO THE CAR STATION TRANSFER SUPPLY

The system of providing transfers for the Surface Lines works out about as follows: Rolls of paper, 31 in. wide, of four different colors are always kept on hand, the average supply running from 300,000 lb. to 400,000 lb. Paper is fed into the press from a roll, and while passing through it receives four different impressions—back, front, serial number and dating heads. As it comes out it is cut into sheets of ninety-six transfers each, which are jogged into place. When 100 sheets are in place they are taken off by the operator.

Next the sheets, 500 at once, are cut into six strips of sixteen transfers each by means of a Seybold cutting machine. Each hundred sheets of sixteen transfers are then fed into a new Christensen stitching machine, which turns them out in stitched packages at the rate of 162 books per minute, or five times the rate of the machine formerly used. Again these strips are put on the Seybold machine and cut into single books of 100 transfers each. The transfers are now ready for sorting and distribution.



GENERAL VIEW OF THE TRANSFER PRINTING ROOM

Carried into another room, the transfers are put in bundles of ten books each with rubber bands. They are then wrapped in canvas packages to meet the requirements of each station. Printing is usually twenty days ahead of the date of issue, and the surplus supply which is not required at once at the stations is kept in fire-proof steel bins in the shipping room. Transfers are sent to the stations about two weeks ahead of the date on which they are to be used. The station requirements call for 3,560,000 transfers daily, and these estimates stand for six months, the figures being different of course for Saturdays and Sundays.

OPERATING CAPACITY NOW AMPLE FOR SOME TIME TO COME

The new press has been in operation only a short time, and it has never been necessary to work it to full capacity. The old transfer press of the Kidder pattern, is kept ready for emergency use. This press has seen considerable service since it was installed in 1907. It turns out transfers at the rate of 7000 sheets per hour, there being fifty-five transfers to a sheet and only one sheet being cut at a time.

For some time the printing department has had trouble due to static electricity in the heavy filled paper



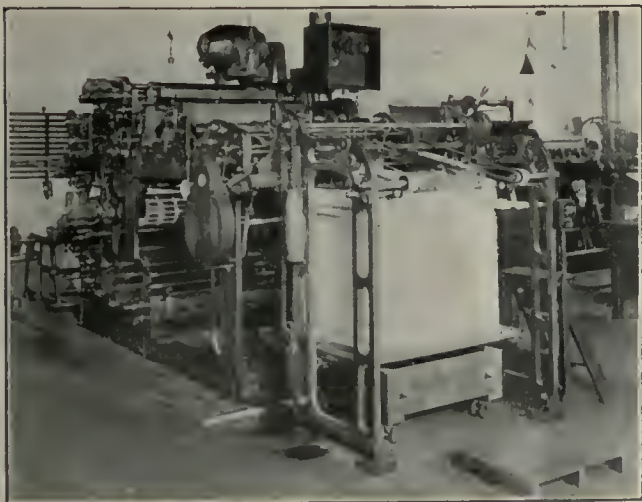
INTERIOR OF THE SORTING AND PACKING ROOM

used for transfer printing. When a change was made in the quality of paper the trouble was eliminated, and there has since been a noticeable economy in the cost of manufacture.

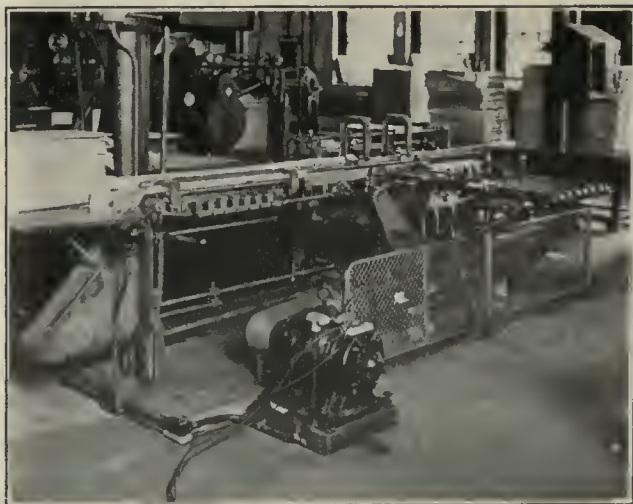
ONLY TWO TYPES OF TRANSFER USED

While the Chicago Surface Lines operate about 1000 miles of track and 172 different routes, the form of transfer which has been in use since 1914 has proved entirely satisfactory. There are only two types of transfers, one for north and south lines and the other for east and west lines. The former has the names of forty-four routes and the latter fifty-one routes. These ninety-five names are made to serve the purpose of the total of 172 routes by providing additional spaces for punch marks worded "Thro L," "Short L," "Downtown" and "Extension."

Thus cars on a Halsted Street line may be routed either "short" or "through" or "downtown," and by punching one of these spaces there is no need of printing the name "Halsted" so frequently. The color system is also used in addition to the word "north," "south," "east" or "west," so that a conductor may more readily determine the direction of travel of the passenger who hands him a transfer.



NEW ROTARY PRINTING PRESS INSTALLED



STITCHING MACHINE IN THE PRINTING ROOM

LETTERS TO THE EDITORS

Indiana Order on Freight Rates Contains Inconsistencies

Aug. 26, 1917.

TO THE EDITORS:

In the recent order issued by the Public Service Commission of Indiana granting increased freight rates to the various electric lines and abstracted on page 260 of your issue of Aug. 10, there are a number of peculiarities.

It will be remembered that when the Interstate Commerce Commission was considering the 15 per cent increase on steam railroads, considerable time was given to a study of the relation between the different classes, and the best steam railroad talent in the country was called into conference. As a result of this conference, which represented more than fifty years of experience of the steam railroads, the relation between class rates was established, it is understood, by Examiner Disque. Nevertheless the Indiana Commission says that its scale "is better balanced, better graduated and more logical than the steam railroad scale."

A comparison of the rates, which on the electric companies is based upon groups of 4 miles and on the steam railroads on groups of 5 miles, will show discrepancies as follows:

Miles	First Class	Second Class	Third Class	Fourth Class	Fifth Class	Sixth Class
10 Steam	25	21 5	17	12 5	9	7
10 Electric..	23 5	20	16 5	13	9 5	7

It will be observed that there is a differential against the steam lines in all of the classes except the fourth and fifth classes. Most of the commodities handled are of the third and fifth class. For distances of ten miles or less from a large shipping center, most of the shipments, independent of the rate, are handled either by wagon or truck. Apparently the commission considered the electric line as a peddler for jobbing houses within a short radius. This will be demonstrated later.

Miles	First Class	Second Class	Third Class	Fourth Class	Fifth Class	Sixth Class
80 Steam	40	34	27	20	14	11 5
80 Electric	40 5	35	28 5	22 5	16	12

In this scale, which covers a very common haul, for the electric lines, local to some and inter-line with others, it will be noticed that the differential is in favor of the steam lines.

Again on interstate business, the Indiana scale conflicts with intrastate traffic. For example, the class rates from Louisville to Indianapolis, 117 miles, will be as follows: 46.5, 39.5, 31.5, 23, 16.5, 13. At the same time, the class rates from Jeffersonville to Indianapolis, 114 miles, will be 49.5, 42.5, 34.5, 27, 20, 15. In other words, the intermediate rate intrastate will be higher than the through rate interstate.

The city of Fort Wayne received a good many shipments from Indianapolis. The class rates from Indianapolis to Fort Wayne, via the electric line, 124 miles, will be as follows: 51.5, 44.5, 36, 28.5, 20.5, 15.5 as against the steam railroad rates of 47.5, 40, 32, 24, 17, 13. This will enable Toledo, Ohio, on account of

interstate rates to enter the Fort Wayne field on the basis of the following rates via steam lines, 44.5, 37.5, 30, 22.5, 15.5, 12.5, or using the basis of a longer haul via electric line and using the electric line mileage of 137 miles the rates will be 49, 41.5, 32.5, 24.5, 17, 14. Again the class rates from Chicago to Fort Wayne, a distance of 147 miles, 50.5, 43, 34, 25.5, 17.5, 14.5, are lower than the electric line rates from Indianapolis to Fort Wayne. This is true to a greater extent between Indianapolis and Kendallville and between Indianapolis and South Bend.

It will be noticed that wherever the differential is given in favor of the electric lines it is on the higher classes, although it is a well-known fact that the shipments second class and higher form a very small percentage of the total tonnage handled by either steam or electric lines. The heavy tonnage, particularly of the electric lines is largely confined to the third, fourth and fifth classes which, under this order, are usually higher than those of the steam lines.

Long-haul freight traffic by the electric railways is penalized under this order, while the short-haul traffic out of commercial centers is divided between the electric lines and the trucking companies.

During the present war conditions the effort should be made to have the electric lines relieve steam lines of a great deal of the l. c. l. traffic to short-haul points, that is to say, "short haul" from the steam railroad point of view. The electric line has its place in the field of transportation, and if placed upon the same basis as the steam line it can relieve the steam lines of a vast amount of l. c. l. shipments, thereby allowing the steam railway equipment to be used in moving c. l. shipments of both commercial and government commodities.

The service performed by the electric line is just as valuable to the shipper and consignee for short haul distances as that of the steam railroad, and for the longer haul, even up to 200 miles, it is worth more to the public than the steam on account of the frequency of service and the short time consumed between terminal points as compared with the steam lines. The electric lines did not ask for an increase above the steam line rates but would have been satisfied with the same general increase.

From the shipper's standpoint, to have two separate bases for rates, one steam and the other electric, is confusing. No shipper having a shipment, consisting of say 1500 lb., of which 200 lb. is first and second class and the balance of the lower classes, will separate such a shipment and give the 200 lb. to the electric line on account of the differential in high-class rates and the balance to the steam line where the other classes are lower. The entire shipment will go to the steam line. To any traffic man, either electric or commercial, the inconsistencies between the rates are very apparent.

TRAFFIC SUPERINTENDENT.

Working through the Priorities Board, the War Industries Board is formulating a new list of preferred industries which will be almost twice as long as that issued last April. The list is maintained by a system of priority in determining the use of the six basic elements of industry, which are material, facilities, fuel, transportation, labor and capital.

News of the Electric Railways

TRAFFIC AND TRANSPORTATION

FINANCIAL AND CORPORATE • PERSONAL MENTION • CONSTRUCTION NEWS

Municipal Ownership Offer

Inability to Agree on Advance in Fares
Results in Offer from City to
the Seattle Company

The transportation problem in Seattle, Wash., was given a new twist recently when Mayor Ole Hanson, in a letter to A. W. Leonard, president of the Puget Sound Traction, Light & Power Company, offering to take over the traction system and lines of the two private concerns operating in Seattle and run them under municipal operation.

The offer was made by Mayor Hanson and the City Council, following conferences held between city and traction officials, in which it became evident that no basis of agreement could be reached on the proposition of increasing railway revenues sufficiently to meet the requirements of the company in taking care of trainmen's increases. The City Council expressed itself as irrevocably opposed to an increase in fares, and President Leonard asserts that no other means of increasing revenues is practical.

The report of Thomas F. Murphine, superintendent of public utilities, who has completed an investigation of the books of the Puget Sound Company, recommends immediate improvement of railway service in Seattle, but opposes higher fares to meet added expenses.

THREE PLANS SUGGESTED

To increase the company's revenue, the report suggests three possible plans:

1. Increase the fare to 7 cents. This would add \$1,282,279 to the revenue annually. 2. Increase the fare to 6 cents with 1 cent additional for transfers. This would increase the revenue approximately \$1,000,000. 3. Reduce the cost by waiver by the city temporarily of the franchise requirements calling for the 2 per cent gross earnings tax, \$400,000 for paving, and the charge for use of bridges built and maintained by the city, and add to the revenue by economies in management, such economies to include skip stops and one-man cars.

The third plan is strongly recommended by Superintendent Murphine for adoption. It is this plan that the Council as a whole favors.

President Leonard of the company argues that the plan is impracticable and purely theoretical, and that only a substantial increase in fares would enable the company to meet the new wage scale and provide additional service demanded by the city. He placed the rate of fare which he thought the com-

pany should be allowed to charge at 6 cents, with an additional cent for each transfer.

When it became evident that no agreement could be reached between city and company officials, the Mayor and Council made the offer to the company to lease the lines during the period of the war.

President Leonard declined to comment on the lease proposition, other than to say: "It has possibilities." It is expected, however, that F. S. Pratt, chairman of the board of directors of the company, who will arrive in Seattle shortly, will submit the matter to the board of directors.

A serious phase of the situation resulting from the failure of the city and company officials to agree upon the rate of fare to be charged, is the effect upon the wage agreements which had been entered into between the company and its employees. The new wage scale, under its original terms, was to have been ratified by Aug. 20, or the question of wages would be submitted to the War Labor Board for adjudication. Mayor Hanson has asked the local branch of the Amalgamated Association to delay action for another week, pending action of the companies on the proposition from the city.

Mayor Hanson and Mr. Murphine favor advanced wages to trainmen, and recommend the adoption of a flat scale for the municipal street car men of 62½ cents an hour, 2½ cents more than the maximum to be paid by the traction company.

Labor Board on Individual Contracts

Frank P. Walsh, joint chairman of the National War Labor Board, and Frederick N. Judson, alternate for Joint Chairman William Howard Taft, have issued the following statement with regard to the board's decision on Aug. 21, in the case of the Smith & Wesson Company, Springfield, Mass.:

"The National War Labor Board, in its recent ruling in this case, did not pass upon the validity of the individual contracts of the company with its employees, but said that whether such contracts were valid or not, a further making of them should be discontinued during the continuance of the war under the principles of the board, in the interest of industrial peace. The board also recommended for the same reason that the company should re-instate the employees who had been discharged for violation of the contracts, whether the discharge was legally valid or not under the terms of the contracts."

Denver Wage Negotiations

Company's Attitude on Wages and
Unionization Stated Frankly to
the Public

The answer of the Denver (Col.) Tramway to the demand of employees for a wage increase averaging 22 cents an hour, and totaling \$882,596 a year, is an offer of an increase of 6 cents an hour, totaling \$240,708 a year.

At the end of a conference between F. W. Hild, general manager of the company, and a committee of the employees, no agreement being reached, the committee announced that if the company agreed the union would be willing to take the matter before the War Labor Board at Washington. The union would not consent to lay its case before the Colorado Utilities Commission.

PRESENT WAGES ADEQUATE

The reply of the tramway to the wage schedule proposed by the new association asserts that the wage increases announced by the company on July 16, to go into effect from Aug. 15, are just and sufficient, because on the whole they parallel the increase in the cost of living.

The accompanying table shows the scale of wages in cents per hour in effect in 1914, the scale now granted by the tramway, and the scale demanded by the trainmen:

TRAMWAY TRAINMEN'S WAGE
SCHEDULE PER HOUR

Years of Service	1914 Scale	1918 Scale (Aug. 15)	Per Cent Increase Granted	Scale Asked by Trainmen	Per Cent Increase Demanded
First	24	34	41.8	50	108
Second	26½	36½	37.7	52½	98
Third, fourth and Fourth,	28	38	35	55	96.4
Fifth	30	40	33½	55	83.3
Sixth and following	30	40	33½	55	83.3

The demand of the union for a closed shop contract is answered by the tramway with the statement that the policy of the company is exactly the same as the policy of the government as expressed by President Wilson and as laid down by the War Labor Board in its statement of April 8.

The wage question is discussed at length in a pamphlet addressed to all the employees of the company on Aug. 13. The matter was considered of such vital concern that copies were distributed for the information of the public.

Cincinnati Settlement Ordinance Passed

Service-at-Cost an Outstanding Feature of New Grant, Which Will Expire in 1931

The revised railway ordinance, upon which a committee has been at work for some time, was passed by the Council of Cincinnati, Ohio, on Aug. 23 by a vote of twenty-five to three. It provides for a sliding scale of fare based upon the cost of operation, with 5 cents as the initial rate. Mayor Galvin had already pledged his signature to the ordinance, which is to become operative on Sept. 23, unless referendum proceedings should block it. The grant will expire on April 27, 1931, the end of the revision period.

FEW CHANGES MADE

Of the 167 amendments adopted by the general committee since the submission of the draft by the sub-committee on Aug. 9, all but a few related to phraseology and other minor matters. In the main, the provisions are as established by the sub-committee.

The most important amendment accepted by both the company and the committee substituted an initial fare of 5 cents for one of 6 cents, as provided in the original draft. A long discussion of this point took place before the committee on the day previous to the passage of the ordinance and the company agreed to it in order to give it a test that will satisfy the public. At the same time Walter A. Draper, vice-president, stated that the officers felt sure that it would not yield an income sufficient to cover the expenses.

The 5-cent rate will continue three months, after which readjustment will be made every two months, with one month additional each time for putting the new rate into operation. This really means that the periods of change will be three months apart. At the last committee meeting the citizens' committee seems to have changed front and asked for a flat rate of 5 cents for the entire revision period of thirteen years, with a 6-cent rate during the period of the war and one year thereafter. This was probably due to a realization that the rate might run higher than 5 cents at other times than during the war.

The change in rate in the fare schedule is one-half of 1 cent at a time. For instance, if, at the end of the first three months, it is found that there is a deficit, the rate will be advanced to 5½ cents. Should the same condition prevail two months thereafter, the 6-cent rate will go into effect at the expiration of the third month. Likewise, the fare will be reduced automatically one-half of 1 cent each time, when it is shown that an unnecessary surplus is accumulating.

CLEVELAND FARE PLAN COPIED

For regulating the fare, a plan has been adopted resembling that in effect at Cleveland. A reserve fund of \$400,000 will be provided, into which will be paid all surplus remaining after

the payment of operating expenses, taxes and returns on investment and for rentals. When this fund shall have reached \$650,000, the fare is to be reduced to the next lower rate. It is provided that when the income is insufficient to meet the expenses and payments mentioned, the deficiency shall be made up from the reserve fund. When the fund reaches a minimum of \$250,000, the fare shall be advanced to the next higher rate. The company must provide the minimum of \$250,000 and the amount must remain above this to preserve the initial rate.

An amendment made to the original draft at the last meeting of the committee gives to the city complete control of the re-routing of cars and the construction of extensions.

TERMS FOR INTERURBAN OPERATION

All of the principal provisions of the loop lease ordinance passed last year were embodied in this ordinance, except those which were specifically set aside by the Supreme Court.

The company is authorized to carry freight and express over its tracks during non-rush hours. The receipts from this source are to be used for the reduction of the passenger rate.

Provision is made for the operation of interurban cars over the company's tracks on terms to be agreed upon by the companies interested. If an interurban company should not be satisfied with the terms demanded, it may appeal to the city and the city's order shall be enforceable. The company is also required to make track connections with any rapid transit or underground railway that may be constructed by the city.

The company objected to the provision which requires it to make out an annual budget subject to the approval of the Director of Street Railroads. Supplemental budgets may be made out to take care of emergencies.

INCENTIVE TO LOWER FARES

As an incentive to lower fares, when the rate of fare is 5 cents or less, 55 per cent of the surplus gross receipts is to be paid to the reserve fund and 45 per cent to the company. When the rate is 5½ cents, 70 per cent is to go to the reserve fund and 30 per cent to the company. When it is 6 cents, 80 per cent will go to the reserve fund and 20 per cent to the company and when the rate is above 6 cents, all the surplus receipts are to be paid into the reserve fund.

The other provisions of the ordinance remain substantially as summarized in the *ELECTRIC RAILWAY JOURNAL* for Aug. 17, page 302.

The sub-committee which framed the original revision of the ordinance consisted of the following: Director of Street Railroads W. C. Culkins, City

Solicitor Saul Zielonka, Assistant City Solicitor Dennis J. Ryan, Councilman Cliff E. Martin, James A. Wilson, member of the Mayor's Advisory Board, and Charles A. Groom, attorney for the Cincinnati Traction Company.

The general committee which conducted the hearings and recommended the ordinance for passage included Councilmen George J. Schlichte, Michael Mullen, O. K. Jones, Cliff E. Martin and John Burkhauser, comprising the Council committee on street railroads, and James A. Wilson, James P. Orr, C. H. M. Atkins, G. M. Sherz and Walter J. Friedlander, making up the Mayor's advisory committee.

It will require a petition with the names of 10,000 voters to bring the ordinance to a referendum vote.

Chicago Measure Repassed

The Chicago traction ordinance, passed by the City Council on Aug. 14, was again approved by the same body on Aug. 22, after Mayor Thompson had vetoed the measure and after States Attorney Hoynes had turned the matter over to the grand jury to investigate charges of corruption in connection with its passage. The vote of fifty-one to nineteen, a gain of three supporters, showed how the Aldermen were impressed by the action of the Mayor and the State's Attorney. Politics was said to be the basis for opposition on the part of both these officials. The latest reports from the grand jury were to the effect that no basis for criminal action had been found.

Hardly had the franchise been passed on Aug. 14 when the States Attorney sprung his charges of bribery and brought them to the attention of the grand jury. Aldermen who had voted against the measure, as well as several real estate dealers, were subpoenaed and there were many stories printed about money having been promised for votes. There was no mention of company officials in this connection. The newspapers did not take the charges seriously, and it was suggested that the State's Attorney had taken this step to "steal the thunder" of Mayor Thompson, who is a candidate for United States Senator and was known to be opposed to the ordinance.

Even when the Council was about to convene on Aug. 22 to listen to the Mayor's veto message, the State's Attorney had his deputies around the city hall serving subpoenas. The Mayor's message was bitter in condemnation of the ordinance. When it had been presented the Aldermen debated for five hours and the count of votes then showed an overwhelming majority in favor of submitting the measure to popular referendum.

While the Council's approval does nothing more than give the people a chance to vote on the measure, it is likely that politics will play a big part in its consideration during the next few months. The popular vote will take place on Nov. 5.

Nation to Control Power Resources

Proposed Bill Gives President the Authority to Build or Use Stations or Energy to Meet the Paramount National Interest

T. W. Sims, chairman of the House committee on interstate and foreign commerce, has introduced in the House of Representatives a bill to provide further for the national security and defense, and for the more effective prosecution of the war, by furnishing means for the better utilization of the existing sources of electrical and mechanical power and for the development of new sources of such power. The bill provides \$150,000 for administrative expenses and \$200,000,000 for the purchase and building of power plants.

The proposed legislation is to be known as the emergency power act. It is not to be confused with the water power bill now pending in the House of Representatives. It will not be considered in connection with that bill, which is already on the floor of the House, while the emergency power act has just been referred to the committee.

In making the bill public, Mr. Sims issued a statement in part as follows:

We are facing a power shortage which is and for some time past has been acute and is hampering our progress on war production. So this measure authorizes the President to erect power stations near the coal mines and at other points where he may deem them necessary, or to extend financial aid to persons or corporations about to do so, and therefore desiring to secure results of tremendous, immediate and inestimable value to America. It is considered necessary by representatives of the administration, by representatives of the great power companies and by economists, who attacked the problem from various view points, and is indorsed by all of them.

The plans are to confer upon the President all necessary power to deal with the urgent power situation properly and effectively and to place at his disposal sufficient funds with which to assure adequate operation. The bill concerns:

1. Increased production of power available for war industries and shipyards.
2. Economy in the use of fuel.
3. Reduction in the railroad freight load, especially in the fuel load.
4. Increased production of metallurgical coke, toluol, ammoniacal liquor, all recovered from coal.

The greatest immediate need is perhaps to give the munition factories and shipyards additional power, which cannot be supplied by the existing supply companies with the most economical and efficient means of producing power, and to decrease the amount of fuel to be transported by the railroads and in turn make possible an early electrification of congested railway lines, which Director General McAdoo prepared for only a few days ago.

In addition to our war needs there is a wide spread demand for increased production and adequate distribution of fuel, light, heat and power for city, rural communities and industries, which will continue to increase after the war when the country will return to normal conditions and can and will compete for the trade of the world.

The plan adopted to solve any one of those problems should primarily include conservation of transportation and increased production of coal products and power. The appropriation required for all these is provided in the bill just introduced.

The bill grants sweeping authority to the President to construct power plants, to install and lease additional machinery in existing private plants, to make advances for expanding private plants, to acquire or lease private plants or to commandeer the power output. Provision is made for repayment of gov-

ernment advances and for the return of private property at the President's will.

The bill includes penalties of imprisonment or fine or both for any who knowingly neglect or refuse to comply with any order or requisition made by the President or any officer, agent or agency designated or created under the act.

The proposed act has the backing of the administration. The bill was drawn three months ago by the War Industries Board after consultation with J. B. McCall of Philadelphia, P. H. Gadsden and E. K. Hall. It was submitted to several public utility companies at the instance of different departments of the federal government.

At hearings beginning on Aug. 23 Secretary of War Baker made a general statement to express, after conversation with President Wilson, the attitude that should be taken by Congress toward an increase of power facilities to assist in winning the war. Secretary Baker said that there is existing power to take over plants and operate them on government account, and the War Department has taken over some and is operating them.

In his opinion, however, this is not the time to settle the great policy of federal ownership. What is wanted now is to get the power. He thought that in passing legislation of this sort the question should be left wide open so that the succeeding Congresses will be free to determine the great peace policy when the time comes for them to turn their attention to it.

In regard to the basis upon which utilities might repay government loans, Secretary Baker said:

"We ought not to jump at an estimate of the difference between peacetime value and war-time costs, but ought to make an arrangement by which the government will aid in the financing as far as may be necessary and allow the exact amount of the government's contribution to be determined after the war is over and things have returned to normal by an appraisement of the value of the plants to the company, and let the government then pay the difference between the appraised value and the cost during war times."

\$200,000,000 WILL BE NEEDED

Lieut. W. W. Stanley, executive assistant to Frederick Darlington, chief of the power section, War Industries Board, testified that in the Philadelphia, Chester and adjacent district there will be required during this year and next year about 120,000 hp. additional, at an estimated cost of \$14,500,000. New Jersey will require at least 40,000 hp., estimated to cost \$5,500,000. The Pittsburgh District will need 440,000 additional hp., at an estimated cost of

\$35,000,000. Baltimore, Lancaster and the territory between will need 53,000 hp. more, at an estimated cost of \$3,942,000. The Pennsylvania anthracite region needs 53,000 kw., involving an estimated cost of \$8,000,000.

Seventy of the larger New England plants, out of a total of about 260, will need 75,000 hp., additional, and the cost is estimated at \$14,625,000. In the Southern States the additional power required for 1918 and 1919 will be 135,000 hp. It will cost approximately \$15,000,000. A miscellaneous group of smaller power systems in the Eastern and Middle West States will need about 250,000 hp., at an estimated cost of \$31,250,000. The Pacific group is short of power, owing principally to the increase in shipbuilding on the Pacific Coast, and a preliminary estimate of desirable expenditure for this year and next year is not less than \$10,000,000.

The total figures show a present installation of about 3,716,210 hp., and 1,233,300 hp. more are required at a total cost of \$138,427,000. Lieutenant Stanley said that it is not intended that these figures shall be final. It cannot be predicted in power what the increase of the army to 5,000,000 men will mean. These figures do not make allowances for that increase. An estimated expenditure of \$200,000,000, however, is not too large by any means, because work all over the country will have to be started this fall and next winter and next spring, as soon as weather conditions are considered favorable, to get the plants built in time to pick up the load that will come on as the army and navy contracts are fulfilled.

Bernard M. Baruch, chairman of the War Industries Board, stated that the board feels not only that it should help work out the war program, but that it should look after the necessary and vital civilian needs—that is, the heating, lighting and transportation necessary in order that the populace back of the army may live in ordinary comfort.

In speaking of the coal situation Mr. Baruch declared that the real reason why the emergency power legislation is wanted is the immediate need of power in the quickest way to get it, and he believes that the cheapest way to get it and the only way to get it is as suggested by this bill.

Relief Plan Impracticable

F. I. Fuller, of the Portland Railway, Light & Power Company, Portland, Ore., has advised the City Council that the plan of operating city railway cars over the lines of the Southern Pacific Company, to serve the shipyards, is impracticable. He asserts that there are no cars available in the equipment of either company, and in addition numerous switches and side tracks would have to be built for this service, as there is now only a single-track railway past these industries.

News Notes

Fire Destroys Power Plant.—The power plant of the Rock Island Southern Railroad at Cameron, Ill., was destroyed by fire recently. The entire equipment of the building, as well as several cars, was burned. Arrangements have been made with the Illinois Traction System to secure energy from Galesburg for a short time.

Public Opinion in Favor of Mr. Cameron.—Although more than a month has passed, no return has been made on the indictment charging Bruce Cameron, superintendent of transportation of the United Railways, St. Louis, Mo., with instigating the theft of referendum petitions, as noted in the *ELECTRIC RAILWAY JOURNAL* of July 20. Indeed, accountants employed by Circuit Attorney McDaniels to investigate the case have reported themselves unable to find payments alleged by one Jackson, who committed the theft and upon whose charges the indictment was drawn. Public opinion is growing that Jackson's story was a product of the imagination.

Agreement on Working Hours.—An agreement between the United Railways, St. Louis, Mo., and the union of its employees regarding the working hours for the men became effective on Aug. 15 according to Anthony O. Piant, president of the union. By terms of the agreement all runs are to be ten hours, or as near as conditions will permit. A 25 per cent bonus is to be paid to regulars for overtime. Car crews who work five hours, or less will receive pay for the full five hours. Those working more than five hours will be paid for eight hours. Regular crews will be paid a 25 per cent bonus over platform time for single trips. Motormen will be paid 10 cents for each bundle of newspapers which they handle.

Electrification at San Francisco.—Electrification of the Belt Line Railroad in San Francisco, Cal., has been decided upon by the State Board of Harbor Commissioners under whose jurisdiction the line operates. The Belt Line runs along the waterfront, connecting the various piers with the several railroads that enter San Francisco. The decision to electrify was primarily the result of the high cost and the uncertain delivery of additional steam equipment which is now needed. It is recognized, however, that electrification will improve the terminal facilities and decrease fire hazard. While trolleys and feeder lines are being strung, it has been deemed advisable to provide also for electric service on the piers so that labor saving devices, which may be installed later, can be readily accommodated.

Board of Control Reports on Kansas City Railways.—The annual report of Robert P. Woods, city member of the Board of Control of the Kansas City (Mo.) Railways, has been issued for the fourth year, ended July 7, 1918. The report contains 241 typewritten pages, 8 in. x 11 in., including many tables and several illustrations. It is bound in cloth boards. The introduction is a brief résumé of the events of the year, and the remainder of the report is divided into chapters on accounting, way and structures, transportation, equipment and power, electrical distribution and substations, summary of contents of previous reports and several appendages. Some of the more important subjects covered are a special financial report with the budget for 1918. The history of the skip-stop, data on the 6-cent fare case, a report of the increased power rate case between the railways and the light company, and a history of the various labor troubles which have occurred during the year.

Temporary Wage Increase at Holyoke.—The Massachusetts State Board of Conciliation and Arbitration has awarded a temporary increase of 6 cents an hour to employees of the Holyoke Street Railway, covering the period from June 14 to Oct. 1, 1918, when a new agreement will be made. The following wages now apply: First six months, 35 cents; one year, 36 cents; two years, 37 cents; three years, 39 cents; four years, 41 cents an hour. The carmen's petition for another increase after Oct. 1 will be settled on the basis of initial periods in the first year of three and nine months, with 41 cents an hour as the minimum rate for all who have worked more than one year. The present decision of the State board awards linemen, shop and carhouse employees and truckmen 8 cents an hour increase over the rate of wages in effect on Sept. 17, 1916. The wages of employees who have by agreement received an increase of 8 cents an hour since the foregoing date are not to be reduced.

Government Needs Thousands of Draftsmen for War Work.—The vast activities of the government in construction and manufacture in connection with the war program necessitate the employment of literally thousands of additional draftsmen of various kinds. The United States Civil Service Commission, whose duty it is to recruit these civilian positions, announces vacancies in large numbers of drafting positions. The filling of these positions is urgently necessary, as they have a direct connection with the war organization. Applicants will not be required to report at any place for examination, the ratings being based upon the applicant's education, training, experience, etc., as shown by the application and corroborative evidence. Full information and application blanks may be obtained by communicating with the United States Civil Service Commission, Washington, D. C., or with

the secretary of the board of civil service examiners at Boston, New York, Philadelphia, Atlanta, Cincinnati, Chicago, St. Paul, St. Louis, New Orleans, Seattle or San Francisco.

Emergency Railway Lease Arranged.—The Board of Public Utility Commissioners of New Jersey has approved the proposition of the Emergency Fleet Railway, a part of the United States Emergency Fleet Corporation, to lease a war emergency trolley line from Gloucester City to Newton Creek, in Camden County, N. J., to the Public Service Railway for the period of the war and six months after the war. The line will be built and operated by the Public Service Railway for the Emergency Fleet Railway, and the Public Service Railway is to pay annually 5 per cent of the cost of the road as rental to the leasing company. At the close of the war the Public Service Railway will lease the line for 75 per cent of its cost. This line has been found necessary by the Emergency Fleet Corporation to provide transportation facilities for workers in the shipyards of the New York Shipbuilding Company at Camden and the Pusey & Jones yards in Gloucester City. The cost of the road will be about \$215,947. The Emergency Fleet Railway was recently incorporated.

Program of Meeting

Safety Congress at St. Louis This Year

One hundred and seventy-four speakers are scheduled to address the Sixth Annual Safety Congress, which will be held in the Hotel Statler, St. Louis, Mo., from Sept. 16 to 20 inclusive. President Wilson will give a five-minute talk by telephone from Washington, Charles M. Schwab will speak on "The Democratization of Industry," Secretary Franklin K. Lane will discuss "Safety as an Asset in Winning the War," and many other men of national reputation will appear on the program.

The electric railway section will meet on Sept. 19, at 9:30 a. m.

The program is as follows:

Reports of officers and committees. Addresses: "Getting Results: Education vs. Discipline," by C. G. Rice, Pittsburgh Railways; "How the Various Efforts to Promote Safety in a Community Can Be Co-ordinated," by V. J. Waltz, Toledo Railways & Light Company; "The Small Company and Intensive Training," speaker to be announced; "The Mission of the Municipal Publicity Expert," by D. E. Parsons, East St. Louis & Suburban Railway; "The Conservation of Humanity and Prevention of Accidents by Traffic Survey," by R. N. Hemming, Fort Wayne & Northern Indiana Traction Company.

The officers of the electric railway section this year are: Chairman, Julien H. Harvey, Director Public Safety Campaign, Rochester, N. Y.; vice-chairman, S. W. Baldwin, The Connecticut Company; secretary, J. C. Davidson, Denver Tramways.

Financial and Corporate

Appeals to Put Work Off

Capital Issues Committee Wants All New Utility Work Stopped Except that Necessary to War

Every extension of an electric railway line, electric lighting system, water main, street paving or other public utility enterprise not absolutely essential to the war should be postponed until peace times, said the Capital Issues Committee in a letter sent on Aug. 26 to all state public utility commissions. These state bodies were urged not only to frown upon additions and betterments requiring capital expenditures, but also to remove from public service corporations, if possible, the necessity of carrying out contract or franchise obligations which might be dispensed with in the war emergency.

A PRELIMINARY MEASURE

The letter was the first of several measures planned by the Capital Issues Committee in co-operation with the Treasury and other financial agencies to draw tighter the nation's purse strings and prevent by a voluntary, though effective, method of supervision the dissipating of capital in less essential enterprises. In writing to the state commissioners the committee made the following statement:

"You are, of course, familiar with the creation by Congress of the Capital Issues Committee for the purpose of giving effect to the Government's policy of 'War Business First' by supervising the issuance of new securities for capital expenditures. It is plain that all of us must avoid every unnecessary use of capital, involving also the use of labor and materials, in order not to interfere with the financial and industrial requirements of the government in its paramount task of waging and winning the war.

"If the men, money and material which the government needs are to be made available for essential war purposes, there must necessarily be a considerable degree of sacrifice on the part of individuals, communities and corporations in adjusting themselves to the substitutions and changed standards which the situation compels. Existing facilities must be made to serve in place of new ones, regardless of temporary inconvenience and discomfort, unless the public health or paramount local economic necessity is involved.

APPLY WITH MARKED FORCE TO UTILITIES

"May we suggest to you that these considerations apply with marked force to the public utility situation. The extensions and betterments which public service corporations are accustomed to

make in normal times, either on the initiative of their own enterprise or by direction of the regulating commissions under which they operate should, in our opinion, be postponed until after the war, unless an immediate war purpose is served, and may we ask of you consideration of the propriety of deferring even the performance of contractual obligations arising from franchise or other local requirements, when no military or local economic necessity is served by such expenditures.

"The Capital Issues Committee feels certain that your commission will recognize the paramount need of the national government when passing upon proposed additions and extensions by public utility companies, and asks that you co-operate in giving effect to the purposes of the government by restricting every unnecessary use of capital, labor and materials for extensions, betterments, street paving, or other purposes, even waiving, if in your power, the legal requirements that obtain in times of peace, until the present emergency has passed."

COMMITTEE HAS WHIP HAND

The suggestion of the committee, which consist of seven members, with Charles S. Hamlin, member of the federal reserve board, as chairman, carries special weight in view of the committee's power to supervise applications for issuance of stocks, bonds or other securities for capital purposes, and to withhold its approval if it deems the project non-essential to the war. Recent developments have shown that most banks and organized investors decline to buy securities not approved by the committee.

P. R. T. Stockholders Meet in October

The annual meeting of the stockholders of the Philadelphia Rapid Transit Company regularly called for Sept. 18, the third Wednesday of the month, will be adjourned until Oct. 16, the third Wednesday of October, and the completion of the full annual report for the year ended June 30, 1918, will be deferred until after the date set by the Public Service Commission for its consideration of the city contract. As the action of the commission on this important matter will be far-reaching in its effects on the future financing of the company and the transportation facilities supplied to the public, it is greatly desired that the management be in a position, when submitting the annual report to the stockholders in October, to then recommend such policy as may be made necessary by the decision of the Public Service Commission.

Reorganization Approved

California Commission Sanctions Plan for Rehabilitation of Petaluma & Santa Rosa Railway

The California Commission has issued an order approving the reorganization plan of the Petaluma & Santa Rosa Railway. This plan contemplates that the properties of the company, which have been ordered at foreclosure sale, be acquired by a new corporation.

1,872,000 of new securities.

Under the order of the commission the new corporation is authorized to issue \$698,400 of 5½ per cent, twenty-five-year first mortgage bonds, \$173,600 of 6 per cent cumulative preferred stock, and \$1,000,000 of common stock to acquire the properties. The order of the commission, however, provides that none of these securities shall be issued until the commission has rendered a supplemental order approving the company's articles of incorporation and trust deed.

The Petaluma & Santa Rosa Railway has outstanding \$655,000 of 5 per cent first mortgage bonds due on March 1, 1924, \$217,000 face value of 6 per cent second mortgage bonds, due on April 21, 1917, and \$994,100 of common stock. In addition the company has pledged \$80,000 of first mortgage and \$33,000 of second mortgage bonds to secure the payment of \$76,600 of notes.

The holders of stock of the Petaluma & Santa Rosa Railway are asked to subscribe for stock in the new company at the rate of \$10 a share. The funds thus realized will be used to pay the \$76,600 of notes and pay reorganization expenses. The first mortgage bondholders of the Petaluma & Santa Rosa Railway are to receive an equal amount of 5½ per cent bonds of the new corporation. The \$217,000 of second mortgage bonds outstanding will be refunded through the issue of \$43,400 of first mortgage bonds, \$43,400 of common stock and \$173,600 of 6 per cent preferred stock.

VOTING TRUST FOR SEVEN YEARS

In referring to the voting trust, the commission in its decision makes the following comment:

"The reorganization plan provides for a voting trust, effective for a period of seven years, under the terms of which the preferred stockholders are given control of the properties in the event that the dividends on the preferred stock are not paid regularly. We believe that all classes of stockholders should have all the power and control to which their ownership entitles them. We do not believe that one class of stockholders should be restricted in their complete enjoyment of all their usual rights. However, as they have seen fit, or may be willing, to surrender their rights, the commission should not interpose any objections."

Denver Feels Higher Costs

Result of Operation in 1917 Was a Decline in Net Income from \$424,700 to \$201,500

The gross earnings of the Denver (Col.) Tramway System during the year ended Dec. 31, 1917, increased \$143,591 or 4.38 per cent over those for the preceding year. The operating ex-

stallation brought substantial savings through the large reduction in coal consumption and the reduction in power-plant payroll. Owing to the doubling of coal prices, however, the power-plant economies were practically all absorbed.

The operating ratio (taxes not included) was 56.0 per cent for the Denver Tramway in 1917, as compared to 66.6 per cent for the United States and 66.9

As was the case a year ago, the returns show an increase in the number of passengers carried at each of the several fare denominations from 1 cent to 8 cents. The large increase has occurred, however, in the number of passengers carried for the 1-cent fare—272,902,138, a gain of 24,930,790 passengers. There is an increase of 10,489,891 in the number of passengers carried for the 2-cent fare. As compared to the 272,902,138 passengers transported at the 1-cent fare, the total for all other fares is 158,044,428.

The car mileage was 26,261,231, an increase of 475,184 miles. Traffic receipts per car-mile were 25 cents, an increase of 2½ cents, and traffic receipts per passenger were 1½ cents, an increase of 0.023 cent. Passengers carried per car-mile numbered 16,409, an increase of 1350.

TRAFFIC STATISTICS OF DENVER TRAMWAY SYSTEM FOR CALENDAR YEARS 1916 AND 1917

Passengers carried:	1917	1916
City lines	78,908,562	75,133,046
Interurban lines	1,075,435	1,065,451
Total	79,983,997	76,198,497
Passenger earnings per car mile (cents):		
City lines	26.65	25.86
Interurban lines	27.76	29.30
Passenger earnings per car hour:		
City lines	\$2.55	\$2.49
Interurban lines	4.95	4.89
Car miles operated, passenger:		
City lines	11,696,325	11,427,964
Interurban lines	381,162	389,725
Total	12,077,487	11,817,690
Car hours operated, passenger:		
City lines	1,220,789	1,184,588.2
Interurban lines	21,359	23,851.2
Total	1,242,148	1,207,939.4

penses, however, advanced \$301,158 or 18.6 per cent. This increase was principally caused by wage grants at the rate of \$161,000 a year and the great rise in costs of materials.

The taxes in 1917 increased approximately \$76,742. On the other hand, the other income fell off slightly. The deductions from income decreased on account of retirement of bonds through sinking funds and maturities. The net result of these changes was a loss in net income from \$424,732 in 1916 to \$201,553 in 1917.

During the last calendar year the expenditures for betterments and improvements totaled \$237,347. Of this amount \$167,336 covered the cost of a new steam turbo-generator of 9375 kva. capacity, with condenser and auxiliaries, and one 3000 kw. rotary converter with transformer and additional switchboard apparatus. This in-

crease was 17.04 cents for 1916 and 19.95 cents for 1917 in the case of twenty-two American cities, while the same costs for the Denver Tramway were 13.03 cents and 15.38 cents respectively.

The accompanying table gives some miscellaneous statistics for passenger traffic and earnings on the city and the interurban lines of the system.

Increased Traffic in Glasgow

The report of the Glasgow Corporation Tramways Department for the financial year ended May 31, 1918, shows substantial increases. The traffic receipts amounted to \$6,833,102, an increase of \$771,837 over the preceding year, while the number of passengers carried reached the aggregate of 430,946,566, an increase of 42,651,690.

New Capital Stock Tax Rulings

Collector William H. Edwards of New York made a statement on Aug. 27 to elucidate the capital stock tax, returns for which must be filed and payments made by Sept. 30.

The statement is based on the latest rulings from Washington. Mr. Edwards said:

"All companies not specifically exempt are required to file returns, even though they are not taxable, and regardless of the market value of their capital stock, whether over or under \$75,000.

"Previous regulations also held that both parent and subsidiary companies were liable to tax. The new regulations hold that companies exclusively engaged in the holding of securities of other companies are not engaged in business within the meaning of this act. However, a company engaged in business in addition to owning the securities is liable to the tax.

"Previous regulations held that capital stock once issued would be regarded as outstanding, even though it had been reacquired by the company and carried on its books as treasury stock. This ruling is canceled by the new orders.

"Previous regulations provided rates for capitalizing average of annual net income for determining fair value. New regulations provide that taxpayers shall use for this purpose the rate prevailing in the particular business and locality to make the stock of companies similarly engaged worth par.

"Previous regulations provided that fair value would be determined and reported as follows: First, by market quotations; second, by prices at which shares were sold if not listed on any exchange; third, by an estimate based on book value or a capitalized average of the annual net income.

"New regulations provide for reporting as the fair value the amount shown by the exhibit reflecting the greatest value, except under certain conditions, when the fair value would be the sum reflected by the exhibit which more nearly conforms to the required value."

COMPARATIVE INCOME STATEMENT OF DENVER TRAMWAY SYSTEM FOR CALENDAR YEARS 1916 AND 1917

	1917		1916	
	Amount	Per Cent	Amount	Per Cent
Gross earnings	\$4,419,467	100.0	\$3,276,876	100.0
Operating expenses (including partial depreciation):				
Maintenance	\$472,313	13.8	\$317,301	9.7
Operation	1,142,194	22.4	1,026,268	31.3
General	200,426	3.8	271,204	8.3
Total	\$1,916,933	56.0	\$1,614,775	49.2
Net earnings	\$1,502,534	44.0	\$1,661,101	50.7
Taxes and franchise payments	352,182	10.2	276,440	8.4
Operating income	\$1,150,352	32.7	\$1,384,661	42.3
Other income	19,818	0.6	21,223	0.6
Gross income	\$1,170,170	34.2	\$1,405,884	42.9
Deductions from income:				
Interest on funded debt	\$964,440	24.2	\$980,488	29.9
Interest on notes and accounts payable	2,177	0.1	674	0.0
Total	\$966,617	24.3	\$981,162	29.9
Net income	\$201,553	5.0	\$424,722	13.0

Financial News Notes

Canadian Line Loses Too.—The municipally owned London & Port Stanley Railway, London, Ont., showed net earnings of \$23,508 for the year ended June 30, 1918, as compared to \$26,581 the year preceding. Traffic on this electrified line has gained and rates have been increased, but despite these the higher operating costs caused a reduction of \$3,077 or 11.5 per cent in net. The gross earnings in 1918 totaled \$368,914 as compared to \$316,685 in 1917, but the expenses rose from \$290,103 in 1917 to \$345,410 in 1918.

Interstate Railways Report Loss.—The income of the Interstate Railways, Camden, N. J., for the year ended Jan. 31, 1918, totaled \$519,117. After meeting expenses and taxes of \$447,504 and preferred dividends of \$30,000, the company had remaining a surplus of \$41,613 for the year. The net income of the last year was substantially less than that for 1916, which is explained by an increase in taxes and the failure of the Trenton systems to pay the instalments of rent due Sept. 30, 1917, and Dec. 31, 1917. This was attributable to financial, commercial and labor conditions.

American L. & T. Breaks Even.—During the calendar year 1917 the number of passengers carried by the subsidiaries of the American Light & Traction Company, New York, N. Y., increased 9,430,662 or 33.52 per cent. The total gross for the period increased \$2,307,138, but this was largely offset by a rise of \$2,010,000 in operating expenses and taxes. The net earnings of the holding company for the year were \$5,023,381 as compared to \$5,648,026 in 1916. Dividend disbursements in the two years amounted to \$4,828,107 and \$4,457,767 respectively. The surplus balance on Dec. 31, 1917, was \$12,246,872 as compared to \$12,051,598 at the end of 1916.

Emergency Measures to Save Road.—The Laconia (N. H.) Street Railway

management has decided not to junk the entire road as originally contemplated. Instead it is planned to install one-man cars and improve the finances of the company. Various plants of partial reorganization are under consideration. The part of the road known as the South End loop, about 1.3 miles, is no longer operated and will be ultimately torn up. It is planned to give fifteen-minute service with new one-man cars on the important section of the road from Walker Square, Laconia, to Stark Street, Lakeport, in place of the present thirty-minute service with large two-man cars.

Commonwealth Bond Plan Effective.

—A majority of the bondholders of the Commonwealth Power, Railway & Light Company, Grand Rapids, Mich., have deposited their holdings under the plan for the refunding of the \$8,000,000 of 6 per cent securities outstanding and which matured on May 1 last. The War Finance Corporation advanced \$2,400,000 to the corporation and asked bondholders to accept a new five-year bond bearing 7 per cent interest instead of 6 per cent. The War Finance Corporation ruled that its advance of \$2,400,000 was contingent on the acceptance of the new plan by at least 70 per cent of the bondholders, and this requirement was more than met.

Will Let Dividends Accumulate.—In a statement to stockholders the board of directors of the Middle West Utilities Company says: "Public discussion indicates quite clearly that the normal tax on incomes will be considerably increased. While it is not altogether clear that the interest bearing certificates heretofore issued in lieu of cash dividends upon preferred stock of the company will not be taxable as income, the board of directors, having due regard to the wishes of the stockholders from whom they have heard, are persuaded that it is to the best interest of the stockholders for the time being to defer the declaration of preferred dividends in certificates and allow the dividends to accumulate.

Ferries Carry 46,000,000.—Transbay ferries on San Francisco Bay carried more than 46,000,000 passengers during the fiscal year ended June 30, 1918, according to a statement recently made by John K. Bulger, supervising inspector of steam vessels at San Francisco. Of this number the Southern

Pacific carried on its Oakland, Alameda and Creek routes 24,513,713; 18,982 between Port Costa and Benicia in local travel, and 717,541 between Vallejo and Vallejo Junction. The Key Route, San Francisco-Oakland Terminal Railways, carried 14,319,326, the Northwestern Pacific 5,529,644, the Santa Fe 262,988 and the Western Pacific 67,137. Other ferries included are the Monticello Steamship Company, the Petaluma & Santa Rosa Railway, Martinez-Benicia ferry and Richmond-San Rafael boats.

Three-Year 7 Per Cent Notes Offered.

—Stone & Webster, Boston, Mass., are offering for subscription \$750,000 of Eastern Texas Electric Company, Beaumont, Tex., three-year 7 per cent gold coupon notes dated Aug. 1, 1918, and due Aug. 1, 1921, at a price to yield about 7½ per cent. The notes are in denominations of \$100, \$500 and \$1,000. They are callable prior to Aug. 1, 1920, at 101 and accrued interest and at 100 and interest thereafter on thirty days' notice. The proceeds from the sale of the notes will be used to retire the present issue of \$500,000 of 6 per cent coupon notes of the company due on Dec. 1, 1918, and will also be applied to the retirement of the company's floating indebtedness now amounting to \$300,000, which has been incurred for additions and extensions to the company's plant.

Northern States Notes Offered.—The Guaranty Trust Company, New York, N. Y., the Illinois Trust & Savings Bank, Chicago, H. M. Byllesby & Company, Bonbright & Company and Spencer Trask & Company, compose a syndicate offering an issue of \$2,000,000 of five-year sinking fund convertible 7 per cent notes of the Northern States Power Company (Minnesota). The offering price will be 96 and interest, yielding about 8 per cent on the investment. The notes are to be dated Aug. 15, 1918, and will fall due Aug. 15, 1923, and are convertible at any time after Jan. 1, 1919, into 7 per cent cumulative preferred stock or common stock of the Northern States Power Company (Delaware) at a price of par for the notes, 95 for the preferred stock and 100 for the common stock, with adjustments for accrued interest and cash dividends. Strong sinking fund provisions will retire 45 per cent of the notes before maturity.

Electric Railway Monthly Earnings

CITIES SERVICE COMPANY, NEW YORK, N. Y.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., July, '18	\$1,789,252	\$34,960	\$1,754,292	\$7,062	\$1,747,230
1m., July, '17	1,365,312	34,011	1,331,301	229	1,331,072
12m., July, '18	21,331,886	399,580	20,932,306	20,648	20,911,658
12m., July, '17	16,559,106	314,280	16,244,826	3,759	16,241,067

REPUBLIC RAILWAY & LIGHT COMPANY, YOUNGSTOWN, OHIO

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., July, '18	\$453,488	\$324,612	\$128,876	\$97,643	†\$38,173
1m., July, '17	388,062	257,983	130,019	84,221	†56,142
12m., July, '18	5,833,075	3,899,150	1,933,925	1,124,700	†596,973
12m., July, '17	4,344,363	2,749,919	1,594,444	923,281	†714,354

PHILADELPHIA (PA.) RAPID TRANSIT COMPANY

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., July, '18	\$2,437,393	\$1,429,475	\$1,007,918	\$811,330	\$196,588
1m., July, '17	2,726,262	1,680,547	1,045,715	814,287	231,428

*Includes taxes. †Includes non-operating income.

BANGOR RAILWAY & ELECTRIC COMPANY, BANGOR, ME.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., June, '18	\$73,723	\$43,850	\$29,873	\$19,502	\$10,371
1m., June, '17	65,662	40,422	25,240	18,738	6,502
12m., June, '18	910,855	539,500	371,355	234,003	137,352
12m., June, '17	862,877	488,713	374,164	221,471	152,693

CLEVELAND, PAINESVILLE & EASTERN R.R., WILLOUGHBY, OHIO

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., June, '18	\$50,169	\$34,998	\$15,171	\$11,795	\$3,376
1m., June, '17	47,431	31,632	15,799	11,615	4,184
6m., June, '18	256,192	175,870	80,322	68,939	11,382
6m., June, '17	243,320	152,559	90,761	70,569	20,192

COLUMBUS RAILWAY, POWER & LIGHT COMPANY, COLUMBUS, OHIO

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., June, '18	\$349,168	\$214,254	\$134,914	\$55,452	\$79,462
1m., June, '17	311,975	236,732	75,243	47,019	28,224
12m., June, '18	4,229,372	3,084,224	1,145,148	615,711	529,437
12m., June, '17	3,747,491	2,474,273	1,273,218	531,282	741,936

Traffic and Transportation

Columbus Explains

Fare Rebate Slips in Effect Will Be Redeemed if Courts Decide Against Company

Henry L. Scarlett, city attorney of Columbus, Ohio, has filed a motion in the Federal District Court in which he asks that the suit be dismissed that was brought by the Columbus Railway, Power & Light Company to prevent the city from interfering with its increase in the rate of fare. He asserts that the court does not have jurisdiction in such a case and that the company's petition does not state facts sufficient to constitute a cause of action.

TRAFFIC FALLS OFF

The increase in the rate of fare has been followed by a reduction in traffic. Some of the patrons have used the cars every day without paying, when the conductors refused to sell them tickets. Conductors made no effort to eject them and this policy will be maintained until the courts decide the matter.

A rebate slip good for 1½ cents is given to each person paying a cash fare and a slip good for 1 cent, to each person paying 1 cent for a transfer. In case the courts should declare the increase in fare illegal, these slips will be redeemed by the company in cash or Thrift Stamps.

Officers of the company state that the increase in wages recently granted to the motormen and conductors will aggregate \$700,000 annually and that people who are engaged in circulating stories to the effect that the new rate of fare will yield large profits are misinformed.

S. G. McMeen, president of the company, published the following statement in regard to the action taken by the company:

"In furtherance of its plan to charge 5 cents for a ride and 1 cent additional for transfer, the company appeals to the people of Columbus and to their American spirit of fair play.

EARNING \$31,000 LESS THAN BOND INTEREST

"For the twelve months ended June 30, 1918, the company's railway earnings, after deducting the necessary amount for taxes and depreciation, fell short by more than \$31,000 of the amount of bond interest properly chargeable to its railway property. In addition to this deficit the company faces a further deficit of more than \$560,000 for the next twelve months as a result of the wage increases recently awarded its railway employees by the War Labor Board. In making that award, the War Labor Board recognized the necessity for higher fares in order to meet the increased wages

so awarded, and in strong terms urged the proper rate-making body to grant the company relief in the form of such higher fares. No such relief has been granted and the company now submits to the people the following plan:

"1. The company's railway patrons are asked to pay a 5-cent fare with 1 cent additional for transfer.

"2. Each person paying a 5-cent fare will receive a rebate check for 1½ cents and each person paying 1 cent for a transfer will receive a rebate check for 1 cent, these rebate checks to be redeemable provided it is finally decided by a court of competent jurisdiction or otherwise that the discontinuance by the company of the sale of eight tickets for 25 cents is illegal.

"3. For the purpose of properly determining, among other things, whether or not these rebate checks shall be so redeemed, the company has already instituted suit in the United States Court.

"4. Outstanding tickets, with free transfer privilege, will be accepted as heretofore until all such tickets shall have been honored.

"5. Until further notice there will be no discontinuance of service unless ordered by some competent authority.

"In this endeavor to secure sufficient revenue to meet its operating expenses the company earnestly asks the co-operation and support of the public."

NEW TRANSFER RULES ADOPTED

In making this change the company adopted new transfer rules, fixing the points of transfer, so that patrons can not ride up town and back on one fare and a transfer, or sell the transfer to some one else for that purpose.

Youngstown Report Accepted

The City Council at Youngstown, Ohio, on Aug. 16 adopted the report of the street railway committee which recommended that the Cleveland plan be used there in operating of the railway, which is owned by the Mahoning & Shenango Railway & Light Company.

A special committee has been investigating the Taylor plan at Cleveland and will shortly make a report of its findings. It appears that most of the members of Council are favorable to the plan, which calls for a cost basis, plus proper return on the investment. The railway is willing to accept the idea, as are the state officials.

Peter Witt, former street railway commissioner at Cleveland, will speak in Youngstown soon and explain the operation of the plan. It has been suggested that Mr. Witt be retained in connection with the settlement in Youngstown, but this has not been fully settled.

Buffalo Retrenching

Owl Service Cut Materially in Effort to Keep Down Expenses Following Refusal of Fare Increase

Service between midnight and 5 a. m. was abolished on thirteen of the lines of the International Railway, Buffalo, N. Y., on Aug. 25. This step was taken by the company to decrease its operating expenses and to continue in effect, temporarily at least, the advance in wages of the trainmen, made on June 18. As a result of the referendum of the voters taken on Aug. 20, the International Railway is prohibited from increasing the rate of fare on the company's city lines in Buffalo.

E. G. Connette, president of the company, in a statement announcing the curtailment of all-night car service says:

FIVE-CENT SERVICE FOR A FIVE-CENT FARE

"It was decided by the referendum vote that the International Railway must continue to operate under the limitations of a 5-cent fare, and therefore, it will be necessary for the company to effect readjustments and economies in the service. The officers of the company were directed by the board of directors to give the best possible service within the fare limitations, and to announce any readjustments in advance of their going into effect. A shortage of 250 trainmen makes it necessary to give service during periods most required and to curtail it when it is least needed. So light has been the traffic on the owl cars up to 5 o'clock in the morning that the service will be discontinued except on six city lines."

Under the order discontinuing all-night service many sections of the city are without service after 12:30 a. m. Even on the lines where owl service is maintained, the schedules have been cut from half-hourly service to one car an hour.

Members of the Council who aided the railway in its campaign for higher fares and voted for the resolution to raise the fares are opposed to the company's abolishment of all-night service on the majority of the city lines.

DIRECTORS DISCUSS WAGES

At the meeting of the board of directors of the railway, called to discuss the action of the voters at the special referendum, it was agreed to continue in effect the wage advance recently granted the platform men. The directors took no action on the award of an additional increase of approximately 6 cents an hour granted the employees by the War Labor Board. This latter award was based upon the company's right to collect a 6-cent fare. The award is automatically canceled with the voters' disapproval of a higher fare. No other action was taken by the directors, according to a statement made by President Connette.

Lacks Jurisdiction Over Rates

Georgia Commission So Holds in Atlanta Fare Case, but Recommends a Six-Cent Fare

The Railroad Commission of Georgia has recommended to the City Council of Atlanta that a 6-cent fare be granted to the Georgia Railway & Power Company but has withheld its decision regarding fare increases on the inter-urban lines to Stone Mountain, Camp Gordon and Marietta, Ga. The following extracts from the commission's report give the gist of the situation:

COMPANY FACES SERIOUS PROBLEM

"We do not believe the applicant is facing bankruptcy. We are impressed, however, with the fact that serious problems of financing confront the company, and that upon their prompt solution depends in a large degree its ability to render the vitally important services the public demands.

"It is our conviction that such emergency relief as seems necessary should be spread throughout all the rates covering the entire business of the company.

"The commission finds itself, however, confronted with a grave and difficult question of jurisdiction and power as to affording any of such relief through increases in applicant's street railway rates.

"Section 5 of the act of the general assembly approved on Aug. 23, 1907, increasing the membership and powers of the commission, is in part as follows:

"The powers and duties heretofore conferred by law upon the Railroad Commission are hereby extended and enlarged so that its authority and control shall extend to street railroads and street railroad corporations, companies, or persons owning, leasing or operating street railroads in this state;

"Provided, however, that nothing herein shall be construed to impair and valid subsisting contract now in existence between any municipality and any such company; and provided that this act shall not operate as a repeal of any existing municipal ordinance."

MATTER NOW UP TO COUNCIL

"This commission believes that the applicant is entitled to an increase in its car fares, and that a 6-cent fare would be reasonable and just, so long as existing abnormal war conditions prevail, and the justice of granting such increases by amendment to existing contracts and ordinances, is earnestly urged upon the councilmanic authorities of Atlanta, Decatur and College Park, with the assurance on the part of this commission that, simultaneously with the effective date of such amendment, similar provisions will be made by it as to fares in territory not included in the municipalities mentioned. The commission does not recommend any charge for transfers."

The granting of increased fares is entirely up to Atlanta's Councilmanic body, unless the courts decide that the commission is clothed with the proper

powers. Expressions of opinion from the commission's special counsel follow:

"It must be borne in mind that the question in this case is not whether the state of Georgia has surrendered to the city of Atlanta the sovereign right to fix the rates of this company, so that the same can not be altered or changed, but whether the Legislature of the State has delegated to the Railroad Commission the power to fix such rates, where the same had been previously fixed between the city of Atlanta and the company by contract or ordinance. This distinction is of vital importance in this discussion. We repeat that the question is not, whether the State of Georgia has surrendered its power to fix those rates, but whether it has granted to the Railroad Commission of Georgia the power to fix such rates, when the same had been fixed by contract between the city and the company, or by municipal ordinance. We do not contend that any such surrender of this governmental function has been made by the Legislature to any of the towns or cities in which this company operates.

"As the State has not actually divested itself of the power to fix these rates, an agreement by which the city and this company fix these rates is made subject to the right of the State to change the same.

CAN'T IMPAIR CONTRACT

"The street railway asks for a 6-cent fare within the city limits of Atlanta and 2 additional cents for each transfer. So clearly if the commission grants the application of the company its action will impair this contract between the city and the railway and will pro tanto repeal the consolidating ordinance under which the railway is now operating.

"There is no question that if the application of the railway is granted by the commission this action will amount to an impairment of the contracts between the cities of Decatur, College Park and Edgewood on the one part and the railway on the other part.

"So, in my opinion, the Railroad Commission of Georgia is without jurisdiction to fix the rates within the city of Atlanta, and the rates from and to the other cities above mentioned, so as to alter or change the rates prescribed in the contracts between the company and these cities. The only tribunal which can change these rates is the Legislature of Georgia, the latter having excepted from the grant of power to this commission the right to impair those contract rates or to repeal ordinances under which they were fixed."

A statement made by Mr. Arkwright, president of the Georgia Railway & Power Company, follows:

"The decision of the Railroad Commission vindicates in every particular

the position taken by the company on the merits of all matters involved, including the absolute necessity of an increase in the railway fares to 6 cents in order to meet increased expenses and furnish efficient service. They were prevented from authorizing the increase in railway fares because of a law point involved which the special attorney to the commission decided prevented the commission from granting the relief found to be necessary.

"Pending the solution of the question by the courts or by the City Councils as recommended by the commission, the company will be deprived of the resources necessary to give increased wages to its employees."

The Mayor-elect was elected to office on the platform of municipal ownership of electric plants and street railways and came out strongly against any increase in the company's rates. On Aug. 19 the City Council voted twenty-five to one to restrain the company from putting the new rates into effect on Sept. 1 and decided to start legal proceedings with reference to the ordinance now in existence regarding the 5-cent fare. In some quarters the action of the Council is regarded as its dying gasp while in others it is taken to be the first gun in a determined war on the company.

Kansas Interurban Gets Increase

The Public Utilities Commission of Kansas on Aug. 15 granted the Kansas City, Kaw Valley & Western Railway, Bonner Springs, Kan., increased passenger and freight rates, which will go into effect late in September. In both cases, further investigation is announced, and the rates are explicitly called temporary, to meet the emergency of higher fuel, labor and supply costs due to war conditions. The statement is made that within a year, and anyway at the end of the war, a readjustment will be considered. The company had asked freight rates on a parity with the recent increases granted the steam roads. The advances granted were not to this extent, being only 10 per cent above the existing rates of the line, with the exception of rates on milk, which are not to be changed. Milk rates are now about those charged on Kansas railroads for express. The commission granted a 2½-cents-per-mile basis for passenger rates, as against 3 cents per mile asked.

An unasked-for feature of the commission's order is the schedule of commutation rates. The company has not had any commutation rates heretofore, though, such rates have been used on other interurbans operating in Kansas. The Kaw Valley line's new schedules, under the commission's order, will provide for coupon books for forty single rides in thirty days, on the basis of 2 cents a mile.

The company is permitted to make an excess charge of 10 cents, when passengers who board cars at stations where tickets are sold, do not supply themselves with tickets.

Increases on Interstate Line

Massachusetts Commission Authorizes Retention of Five-Cent Minimum, but Increases Zones

In a decision dated Aug. 14 the Public Service Commission of Massachusetts authorized various fare increases on the Interstate Consolidated Street Railway, substantially approving the recently filed tariff of these lines. The company proposes to retain the 5-cent minimum fare, but to increase the number of zones in which this fare is to be charged. The results of this change may be tabulated as follows:

	Present Charge Cents	New Charge Cents
Mainville to Attleboro.....	5	10
Mainville to Pawtucket, R. I., north line.....	10	20
No. Attleboro to Attleboro..	5	5
No. Attleboro to So. Attleboro.....	5	5
No. Attleboro to Pawtucket, R. I., north line.....	10	15
Attleboro to Pawtucket, east line.....	10	15
Attleboro to Pawtucket, south line.....	10	15
Attleboro to So. Attleboro..	5	5
So. Attleboro to Pawtucket..	5	10

The entire benefit of this increase will not in all cases go to the Interstate Consolidated Company, as the Rhode Island Company has recently been permitted by the Rhode Island authorities to charge 5 cents between Pawtucket and the State boundary, and to discontinue the present joint fare with the Interstate company. Temporarily this arrangement has been continued, but it would cease to exist under the proposed new tariff. Between North Attleboro and Pawtucket the present fare is 10 cents, but the Interstate company's portion of this averages only 7.5 cents. Under the new tariff the fare would be 15 cents, 10 cents going to the Interstate company. The situation between Attleboro and Pawtucket is similar. The company proposes to eliminate all overlaps and transfer privileges, with the result that in Attleboro and North Attleboro 10 cents would be charged for any ride, however short, passing the railroad station in one case and Wamsutta Corner in the other. The company estimates that the proposed new fares would produce a gain in revenue of about \$46,500 a year.

ALTERNATIVE PLAN REJECTED

The Mayor of Attleboro offered an alternative plan, which, if adopted on all lines, was estimated to yield about \$25,000 additional revenue. Upon consideration the commission was of the opinion that the company's plan should be adopted, with some minor modifications.

One defect in the company's proposed tariff, the commission holds, lies in the fact that the fare zones in no case overlap and that transfer privileges are entirely eliminated. The result would be that 10 cents would be charged for a very short ride in the thickly settled portion of Attleboro, North and South Attleboro. In the

judgment of the board the tariff should be modified to correct this defect, the detailed method being left to the company.

A further and more serious defect, which, however, is beyond the jurisdiction of the Massachusetts commission, relates to the charge between Orr's Corner in South Attleboro and adjacent points, and Pawtucket. Under the new tariff this fare would be 10 cents for a ride of about 3.5 miles, since the traffic center of Pawtucket is less than 1 mile from the State boundary line.

If there were only one company and no State boundary, the commission believes that a lower fare than this would be deemed reasonable even by the management, and it is hoped that the Rhode Island and Interstate companies will be able to agree upon some joint ticket arrangement which would offer a fare of say 7 cents to regular riders. South Attleboro is closely associated in a business way with Pawtucket, and the proposed 10-cent fare would, in the opinion of the commission, be an unreasonable hardship for many workingmen.

If no agreement can be reached upon this point, the Public Service Commission is prepared to lend its aid in an appeal to the Interstate Commerce Commission. If a joint ticket is provided, it should, in the opinion of the commission, be available for use in connection with through traffic from points north of South Attleboro.

Accountants Oppose Rochester Increase

The Rochester lines of the New York State Railways have an annual return on capital invested sufficient to make a 6-cent fare unwarranted in Rochester, according to the report filed with the municipal authorities by Marvin Scudder and L. M. Scudder, accountants employed by the city to investigate the financial conditions of the company. The net income from the Rochester city lines in 1917 was \$608,595 and the experts state in their report that this year's net income will exceed \$200,000. The report will be discussed at a special meeting of the Council to be held soon. At that time the Council will decide whether or not favorable action will be taken on the application of the company for an increased fare.

The report comes as a result of a request made by the New York State Railways for permission to charge a fare higher than 5 cents. The Council then ordered an investigation of the company's books. The report shows that the New York State Railways makes no separation of any operating expenses between the city lines and lines outside of the city. The Scudder report shows that the total wage increases granted by the company in July amounted to \$19,922 and that the net increase for the entire year will be about \$94,000.

New Jersey Case Reappealed

Increase in Fare by Two Cents Not Enough to Meet New Requirements of Railway

T. N. McCarter, president of the Public Service Corporation of New Jersey, Newark, N. J., made it known on Aug. 29 at the hearing before the State Board of Public Utility Commissioners on the new application for permission to increase the fares to 7 cents that the company was ready to recede from its original attitude of seeking the increase during the period of the war and ask that the increase be permitted from Sept. 1 to Jan. 1 to make up the expected deficit due to the increase in wages ordered by the Federal War Labor Board. Mr. McCarter said that to meet the new obligations the company must secure \$860,000, and the only way to obtain it was to increase the fares 2 cents, and even with that increase the revenue would fall short of the sum needed.

At the close of the hearing, which lasted three hours, the Utility Board granted a postponement to Sept. 5 to give counsel for the municipalities time to verify the figures submitted by Mr. McCarter, who was the only witness.

Petitions were presented from each of the federal boards. After outlining the purpose of the law creating the Bureau of Industrial Housing and Transportation of the United States Department of Labor of the United States, the petition from that board was concluded as follows:

"That in the judgment of the United States Housing Corporation and the Bureau of Industrial Housing and Transportation of the Department of Labor, the maintenance of the financial stability of the existing lines of Public Service Railway is essential to the continuance of adequate service during the war and the acquisition of capital for the construction of extensions and improvements made necessary by the war."

Urged to Hasten Fare Matter

There was an adjourned hearing recently of the petition of the New York State Railways for permission to increase its rate of fare from 5 cents to 6 cents before the Public Service Commission for the Second District. W. J. Kernan, Utica, represented the railway and Mayor James D. Smith and Corporation Counsel Merrill represented Utica and Corporation Counsel Hancock the city of Syracuse.

William McClellan testified concerning an appraisal of the property which had been made and which was incorporated in the report of the investigation made by Price, Waterhouse & Company of the railway company's financial condition. Mr. McClellan detailed items which were included in the appraisal which had been carried down to June 30, 1917. He said he would

continue the appraisal down to Jan. 1, 1918, and this will be introduced later.

Representatives of Utica and Syracuse contended that the appraisal should not be binding upon any future rate applications by the company.

Mr. Kernan asked that action on the company's petition be expedited as much as possible because of the increase in wages which the company had recently put into effect.

The presentation of the report of Price, Waterhouse & Company was referred to in the issue of the *ELECTRIC RAILWAY JOURNAL* of Aug. 10, page 261.

Detroit Interurban Increases

An order establishing a passenger rate of fare of 2 cents a mile on the interurban lines of the Detroit (Mich.) United Lines has been handed down by the Interstate Commerce Commission at Washington. The order affects the Rapid Railway, including the Shore line; the Detroit, Monroe & Toledo Short Line Railway, between Detroit and Toledo; the Detroit, Jackson & Chicago Railway; the Orchard Lake, Pontiac, Flint and Imlay City divisions of the Detroit United Railway. The order will not affect city fares on the various lines named.

In its petition for an increase the railways pointed out the necessity of increasing revenues so that the increased cost of business be met and operation of the lines be not curtailed.

It is not likely that the new rate will be put into effect much before Oct. 1 due to the fact that it will not become effective until thirty days after new tariffs are filed with the commission and also the fact that it will take considerable time to prepare and print the new fare schedules.

The 2-cent-a-mile rate means from 25 to 50 per cent increases, the average per cent of increase being about 30. The lines mentioned serve 159 cities and villages within a radius of 75 miles of Detroit and have 894 miles of track.

Transfer Protection at Fare Zones

Misuse of transfers issued on the Springfield (Mass.) Street Railway in connection with different fare zone tickets has led the company to require conductors to punch all transfers given out on an 8½-cent ticket once and all given out with 6½-cent tickets twice. By this means the collecting conductor will learn the kind of ticket originally used and how far the passenger holding the transfer is authorized to ride. If the passenger rides beyond the transfer limit associated with the particular ticket originally purchased, the conductor will then collect an additional fare. The tickets will be collected for the first fare on the second car and the transfer will be lifted for the second fare.

The company found soon after instituting the present system of zone fares that passengers who boarded cars near

the boundary of the first and second zones discovered that one stub of a two-ticket string was good for a ride in one zone alone if they requested a transfer. This reduced the cost of the ride to 3½ cents. The stubs used in the other zone were of no use to the original holders, but were exchanged with friends living in other zone limits. The new plan of transfer punching is expected to do away with the opportunities that existed previously for abusing the system.

Transportation News Notes

Women for Binghamton Cars.—The Binghamton (N. Y.) Railway has engaged twenty-five women for use as conductorettes on its lines in that city. The women are now undergoing instruction. Several of the women have sons engaged in war service.

Wants Seven Cents in East Chicago.—The Hammond, Whiting & East Chicago Railway, Chicago, Ill., has filed a petition with the Public Service Commission of Indiana asking authority to increase its railway fares in Hammond, East Chicago and Whiting from 5 cents to 7 cents for adults and to establish a 2½-cent fare for school children.

Change in Gorge Route Fares.—The Niagara Gorge Railroad, Niagara Falls, N. Y., on Aug. 2 filed with the Public Service Commission for the Second District a new tariff schedule relative to commutation fares which it proposes as effective on Sept. 1. Ten-trip, individual, twenty-trip, family or firm, forty-six-trip monthly school, and sixty-trip monthly individual between Niagara Falls, Lewiston and Youngstown and local points are advanced approximately 10 per cent. This is the gorge scenic route.

Further Suspension of Elmira Tariff.—The Public Service Commission for the Second District of New York on Aug. 15 ordered the operation of the Elmira Water, Light & Railroad Company's rates applying to passenger traffic between points other than Horseheads and Watkins and intermediate points further deferred until Sept. 17. This action was taken to permit Commissioner Fennell to complete the investigation. A prior suspension was until Aug. 19.

New Trailers in Seattle.—The Puget Sound Traction, Light & Power Company, Seattle, Wash., has recently put into service ten new trailers, built in the East for the company, with a carrying capacity of sixty-five passengers each. From 3 to 5 o'clock, the trailers are used on the shipyard lines, carrying thousands of workers to and from the tideflats; from 5 to 6:30, they are trans-

ferred to long local lines. The company now has a total of fifteen trailers in service.

Durham Views Fare Increase Kindly.—The increased fares at Durham, N. C., seem to be acceptable to the public, according to R. L. Lindsey, general manager of the Durham Traction Company. The 7-cent fare went into effect on Aug. 3, and, says Mr. Lindsey, "the public has taken to the increase very kindly, and we have been unable to discover, through our men, a single kick of consequence. We credit this to our publicity educational campaign during the preceding months."

Emergency War Plant Service.—The officials of the Singer Manufacturing Company, Elizabeth, N. J., and the Public Service Railway have entered into an agreement under which the employees of the Singer Company will operate cars and take the workers to and from work. This will relieve conditions caused by the lack of motormen and conductors. The railway will pay the men for the time they are on the cars. The Standard Aircraft Corporation, Elizabeth, recently put a similar plan into effect.

Youngstown Retains Peter Witt.—At an informal meeting on Aug. 22, the City Council of Youngstown, Ohio, approved the employment of Peter Witt, Cleveland, Ohio, to make a survey of the railway situation there with a view to the adoption of a system of municipally controlled operation similar to the Tayler plan in Cleveland. Four members opposed the employment of Mr. Witt, but favored the service-at-cost plan. Formal action was expected at the regular meeting during the week ended Aug. 31. A motion to increase the fare to 6 cents, pending the adoption of the service-at-cost plan, failed.

Cleveland Training Women.—The Cleveland (Ohio) Railway, during the week ended Aug. 24, began to employ and train women to take positions as conductors on its cars. At that time it was said that there were 600 vacancies. It is not the intention to replace men who wish to hold their positions, but the idea is to keep the force as nearly up to normal as possible. The women will be paid the same wages as the men and no difference will be made in their duties because they are women. Matrons will be employed at the carhouses on the lines where they are running. The women will be clad in khaki in summer and blue serge in winter.

Ice Cream Containers and Bread Baskets Undesirables.—The Indianapolis & Louisville Traction Company, Scottsburg, Ind., has filed a petition with the Indiana Public Service Commission asking for permission to increase rates on certain classes of freight with the idea of eliminating these freight items from the company's cars. A charge of 10 cents each is asked on empty ice cream containers and bread baskets and an increase in carrying charges for newspapers to 50 cents a 100 lb. The Louisville & Northern Railway & Lighting Com-

pany and the Louisville & Southern Indiana Traction Company are concerned in the petition.

Wants Interurban Fare Increase.—The International Railway, Buffalo, N. Y., has applied to the Common Councils of Tonawanda and North Tonawanda for permission to charge passengers 3 cents a mile on its lines between Tonawanda, North Tonawanda, and Buffalo and Niagara Falls. Representatives of the company told the Councils that unless the company was permitted to increase the interurban fares, schedules would have to be curtailed. Attention was called to the fact that the Buffalo & Lake Erie Traction Company, Buffalo, N. Y., and the Buffalo, Lockport & Rochester Railway, Rochester, N. Y., are now charging 3 cents a mile on their interurban divisions.

Wheeling Fare Hearing.—The Public Service Commission of West Virginia has concluded its hearing on the application of the City Railway, Wheeling, W. Va., for permission to cut out existing reduced rates of fare and to increase the straight cash fare within city limits to 6 cents, with free transfers to and from all connecting lines. Rates now in effect are: 5 cents cash fare to all points within the city limits, tickets six for 25 cents, free transfers to and from all connecting lines. In its application the company sets forth that the existing rates are unjust and confiscatory in that they do not enable the company to make a reasonable profit on the business done, owing to increased expenses of operation. A similar application of the Wheeling Traction Company has not been set for hearing.

Oakland Takes Six-Cent Fare Gracefully.—The 6-cent fare went into effect on the San Francisco-Oakland Terminal Railway, Oakland, Cal., without a hitch. A good deal of advertising was devoted to "selling the ideal" of the need for a 6-cent fare before it was actually put into effect. The *Key System News*, published by the railway, was of considerable aid in this. It is estimated that the majority of passengers board the cars with the exact change ready. This speaks well for the public relations of the company. The company had slides run in a number of moving picture theaters, briefly announcing the 6-cent fare, the reasons that made it necessary, and requesting that passengers have exact change ready. The decision in this fare case was reviewed in the *ELECTRIC RAILWAY JOURNAL* for Aug. 24, page 351.

Act Against Two-Cent Law.—The Illinois Traction System, Peoria, Ill., has filed a bill for an injunction in the Federal Court of the eastern district at Danville to restrain the operation of the 2-cent law. Attorney-General Brundage, members of the commission and state's attorneys of counties in which the company operates are made defendants. The company sets forth that the 2-cent law restrains any increase of its passenger fare and that

the present fare is insufficient to pay for the operation of its line under prevailing conditions. Similar injunction proceedings to prevent the State of Illinois from enforcing the 2-cent passenger law have been instituted in the Belleville Circuit Court by the Alton, Granite City & St. Louis Railway. The petition states that the company operates at a loss when compelled to carry passengers at 2 cents a mile.

Truck-Interurban Haulage.—Highway transport committees in both Kansas and Missouri have begun active organization work, towards stimulating truck travel on rural roads. Ostensibly the truck service is supposed to benefit communities without railroad service. In fact, however, both States have numerous instances of frequent truck service between towns having railroad connections, though such connections provide poor service. An attempt is being made to work out a program of truck-line development, under which the interurban railways will be used to the best advantage. For instance, it has been suggested that instead of planning truck service in lines radiating from Kansas City to a distance of 30 or 40 miles, the lines be laid out with reference to shortest hauls to interurban railways, where such planning is feasible. Thus, the dirt roads, not usable in wet weather, would not be depended on for the major part of the hauling.

Another Seven-Cent Road.—The New Jersey & Pennsylvania Traction Company, Trenton, N. J., announces that it will increase its rates from 6 cent to 7 cents in the several zones on all its Pennsylvania divisions. The new schedule of fares will become operative on Sept. 26. An increase in freight rates is also announced. The company says that commutation zone tickets for the use of school pupils under fifteen years of age and valid on regular school days only will be sold at the rate of \$1.60 per book of forty tickets each, upon application at the offices of the company at Trenton, N. J., and Newtown, Pa. The new schedule of freight rates affects all commodities. The minimum charge on any single shipment will be 25 cents. The company was recently authorized by the Board of Public Utility Commissioners of New Jersey to charge 6 cents on the four zones on the Princeton and Lawrenceville divisions, and by the Public Service Commission of Pennsylvania to charge a like amount on the Pennsylvania divisions.

Higher Rates on Strang Lines.—Higher passenger and freight rates went into effect on Aug. 15 on the Missouri & Kansas Interurban Railway, operating between Kansas City, Mo., and Olathe, Kan., as a result of orders of the Public Utilities Commission of Kansas. The railway had asked readjustment of rates, in some items requesting specific rates, in others asking only for relief, and to be put on parity with new railroad freight rates. The advances granted are about 10 per cent on freight except

milk, on which the company was already receiving about the same rate as the railroads. The new passenger schedule is based nominally on 2½ cents a mile; specific rates are mentioned for each station, in the commission's report, exact distances being figured between the stops at the basic rate. Commutation rates are retained between a few of the stations, with an advance of 25 per cent in such rates to school children. The previous rate to pupils was extremely low.

Skip Stops in Chicago.—Skip-stop operation of cars began on the Chicago Surface Lines on Aug. 25, without any noticeable change in the routine of daily transportation. The new system had been fully advertised in the cars and the newspapers as a government fuel conservation measure. Temporary signs had been posted on trolley poles at the near side of new stopping places several days in advance. There were no charges of discrimination in favor of particular streets because the new system was based on the house numbering system, stops being required outside of the loop district at streets nearest the number 100 or multiples thereof. Steam railroad crossing and other safety stops are to be continued, so that in certain districts there are more than eight stops to the mile. Some of the motormen on the first day made stops which were no longer required. This was from force of habit. In general, however, the new system worked without a hitch and there was a noticeable saving in time on many runs. Schedules for all routes will have to be re-written when the operating officials have had an opportunity to check up on the new running time.

278 Additional Trips in Washington.—Revised routes and complete new schedules for all the lines of the Capital Traction Company, Washington, D. C., calling for 278 additional trips daily and four new services, one of which will be operated between Potomac Park and the Eighth and F Streets Northeast, were announced on Aug. 19 by the Public Utilities Commission. They represent the efforts of the commission and the company to capitalize into better service the running time saved through the installation of skip stops on the company's lines several weeks ago. John A. Beeler, traffic expert for the commission, and officials of the company co-operated in framing the new schedules, which are expected to lead to a considerable improvement in service during both rush and non-rush periods. In framing the new schedules Mr. Beeler and the company officials determined the volume and character of traffic on each line and have sought to equalize the loading throughout the system and utilize the equipment to the best possible advantage. Service has been increased where it is needed most. The principal improvement will be noticed in the non-rush periods, where there is greater possibility of expansion. The changes went into effect on Aug. 25.

Personal Mention

Mr. Shaw a Firm Member

Former Railway Man and A. E. R. A.
President Partner in Banking House
of Knauth, Nachod & Kuhne

James F. Shaw, who has for more than one and a half years past been associated with the firm of Knauth, Nachod & Kuhne, bankers, of New York City, has become a general partner in that firm. His duties will be materially as before, consisting of the developing of new business, general underwriting, etc. This firm is one of the oldest private banking houses in New York, having been established in 1852. It has correspondents all over the world and does a large international banking business and deals in investment securities as well.

Although but forty-five years of age Mr. Shaw has had a remarkable career and at an early age achieved distinction in politics and in electric railway administration. He served for two terms as president of the American Electric Railway Association and its predecessor, the American Street & Interurban Railway Association, and during this period succeeded notably in strengthening that organization and expanding the field of its activities. Under his guidance the company and individual membership of the association was greatly increased and all of the members, both company and individual, were brought into closer touch with the administration and encouraged to take a more active part in the proceedings. Mr. Shaw saw the potential value of the experience of past presidents to the association and through his efforts the past presidents were induced to contribute time and energy much more effectively than before to the work of the association. He must also be credited with the inauguration of the mid-year meetings of the association, the first of which was held early in 1910, during his second term.

While president of the association Mr. Shaw advocated certain electric railway policies which are now generally received, although at the time they were somewhat novel. He believed that the basis for equitable rates of fare should be a scientific study of all of the costs involved, and that fares, taxes and standards of service should be adjusted with respect to each other and with justice to all parties concerned. He felt that the only way in which the proper public relations could be brought about was through frank publicity, and he therefore advocated the use of all means by which exact information regarding electric railways could be given to the public.

Mr. Shaw's electric railway career dates back to 1891, when at the age of eighteen he became superintendent of

the Black Rocks & Salisbury Beach Street Railway after a few months' experience with the Newport Car Company. This road was operated only in the summer months, and between seasons he engaged in the electric railway supply business. His genius for organization brought him many opportunities in the electric railway business in Massachusetts and by the time he was twenty-five years of age he was president and general manager of some thirteen different electric railways. He was the prime mover in the construction and operation of more than 600 miles of electric railway involving an



J. F. SHAW

investment of \$25,000,000. He was also actively identified with other lines of business.

Mr. Shaw served for three terms in the Massachusetts Senate, having been elected in 1907, 1908 and 1909. He was thus a Senator while president of the railway association, which he served in this capacity from 1908 to 1910. While in the Senate he was on the committees on rules, ways and means and military affairs, being chairman of the last named for three years and of the ways and means committee during the 1909 term. He exerted a strong influence in the Senate and was one of the original income tax men of Massachusetts. While his affiliations were naturally with corporations, yet he was able to reconcile the labor and corporation elements in the solution of problems in which their interests seemed to conflict. Although always a strong Republican, Mr. Shaw had the support of many of the Democratic members.

Changes in Personnel

Syracuse Suburban Road Announcements—C. Loomis Allen Re-enters Management Field

Important changes have been announced in the personnel of the Auburn & Syracuse Electric Railroad, the Syracuse & Suburban Railroad and in the firm of Peck-Shannahan-Cherry Inc., Syracuse, N. Y.

By the change Peck-Shannahan-Cherry, Inc., retire from the management of the Syracuse & Suburban road, William J. Harvie retires as general manager and director, Milford Badgero retires as assistant treasurer and C. Loomis Allen becomes general manager of the road.

R. W. Palmer, now general manager of the Auburn & Syracuse Electric road, has resigned to take up a position in Philadelphia and Mr. Harvie has been named as general manager in his place.

These changes were announced by T. C. Cherry, vice-president of Peck-Shannahan-Cherry, Inc., and by C. Loomis Allen. Mr. Cherry said:

"R. W. Palmer, general manager of the Auburn & Syracuse Electric Railroad, has resigned, effective on Sept. 1, to accept a position with an operating company controlled by Philadelphia interests. Peck-Shannahan-Cherry, Inc., announce the appointment, effective on Sept. 1, of W. J. Harvie as general manager of the Auburn & Syracuse Electric Railroad, with headquarters in Auburn. Mr. Harvie is a member of the firm of Peck-Shannahan-Cherry, Inc., and will move his family to Auburn in the near future."

Mr. Allen's announcement reads:

"With the retirement of Peck-Shannahan-Cherry, Inc., from the management of the Syracuse & Suburban Railroad there will occur changes in the personnel of its officers. The resignations of W. J. Harvie as general manager and director, Milford Badgero as assistant treasurer and Harry A. Abbe as superintendent have been accepted, effective on Sept. 1. On that date C. Loomis Allen will assume the management of the railroad. The offices of assistant treasurer and superintendent are abolished."

Since May 1 Mr. Allen has devoted some time to the railroad's finances, and has prepared the plan of refinancing which was approved by the Public Service Commission on Aug. 8, 1918. The order of the Public Service Commission authorizes the issuance of securities, sufficient to pay off the floating debt, to provide the cash for future improvements and to furnish the treasury with cash for working capital.

Mr. Allen, on Sept. 1, will take offices 500-506 Vinney Building, adjacent to the present office of the Suburban Railroad, and will resume his practice in engineering and management of public utilities.

Peck-Shannahan-Cherry, Inc., have moved their offices to the Syracuse Savings Bank Building. Milford Badgero is a member of the firm.

M. J. Powers has been appointed master mechanic of the Cripple Creek & Colorado Springs Railroad, Colorado Springs, Col., to succeed C. A. McCarthy.

J. J. Cogan, formerly general manager of the Cripple Creek & Colorado Springs Railroad, Colorado Springs, Col., has been elected vice-president of the company.

E. K. H. D'Aeth has been appointed secretary of the Trinidad Electric Transmission, Railway & Gas Company, with headquarters in New York, to succeed A. R. Marshall.

Ralph H. Rice, principal assistant engineer of the Board of Supervising Engineers, Chicago Traction, has been commissioned as captain in the construction division of the army.

Joseph R. Wood has been appointed auditor of the Urbana & Champaign Railway, Gas & Electric Company, to succeed Charles E. Cox, who resigned to enter the automobile business.

L. A. Magraw, general manager and chief engineer of the Macon Railway & Light Company, Macon, Ga., has also been appointed treasurer of the company to succeed J. J. Thames, Jr.

Walter A. Neely, former superintendent of the New Jersey & Pennsylvania Traction Company, Trenton, N. J., is now a first lieutenant with the 11th machine gun company in France.

C. D. Green has been appointed auditor of the Aurora, Elgin & Chicago Railroad, Aurora, Ill., to succeed H. A. Nevans, who retired to accept a position with an insurance company in Chicago.

Frederick J. Pratt, who for the last sixteen years has been storekeeper for the Winnipeg (Man.) Electric Railway, has been made purchasing agent of the company to succeed Mr. J. S. Mackenzie.

U. S. Patillo has been appointed electrical engineer and engineer of overhead construction of the St. Johns Electric Company, St. Augustine, Fla., to succeed W. M. Bidlake and Henry Taylor.

Richard Elliott has been appointed treasurer of the Waterbury & Milldale Tramway, Waterbury, Conn., to succeed R. A. Clark. Mr. Elliott has also been elected first vice-president of the company.

E. J. Knight has been appointed assistant secretary of the Middle West Utilities Company, Chicago, Ill., to succeed O. E. McCormick, who has been appointed assistant treasurer of the company.

W. E. Miller has been appointed general manager of the Cripple Creek & Colorado Springs Railroad, Colorado Springs, Col., to succeed J. J. Cogan, who has been elected vice-president of the company.

C. D. Puckiser, formerly auditor, superintendent and general freight and passenger agent of the Caldwell (Idaho) Traction Company, Ltd., has

been appointed assistant manager of the company to succeed J. L. Magee.

E. O. Rugliss has been appointed auditor of the Bloomington & Normal Railway & Light Company, Bloomington, Ill., to succeed F. J. Larsh, who is now auditor of the Atchison Railway, Light & Power Company, Topeka, Kan.

T. B. MacRae has been appointed auditor of the Chicago, North Shore & Milwaukee Railroad, Highland, Ill., to succeed A. G. Moore, who is now auditor of the Chicago, South Bend & Northern Indiana Railway and the Southern Michigan Railway, South Bend, Ind.

R. H. Howell has been appointed claim agent of the Sterling, Dixon & Eastern Electric Railway and the Illinois Northern Utilities Company, Dixon, Ill., to succeed F. M. Smith, who is now connected with the bureau of safety of the Middle West Utilities Company, Chicago, Ill.

Lawrence Polk, assistant to the general manager of the Winnipeg (Man.) Electric Railway, has been appointed secretary of the Winnipeg, Selkirk & Lake Winnipeg Railway, and assistant secretary of the Winnipeg Electric Railway. Mr. Polk has been connected with the Winnipeg Electric Railway for the last fourteen years.

Richard J. Higgins has been appointed general solicitor for the Kansas City (Mo.) Railways. In such position he will have under his immediate direction and supervision all litigation in which the company is concerned. Judge Higgins has been counsel for the company in Kansas. Clyde Taylor will continue his duties as general counsel.

Thomas J. Connolly has been appointed traffic superintendent of the Trenton & Mercer County Traction Corporation, Trenton, N. J., by Edward J. Peartree, acting general manager. Mr. Connolly has assumed his new duties and will devote his time to directing traffic on the various divisions. He has had thirteen years' experience with the United Traction Company at Troy, N. Y.

Leopoldo Marcenco, chief engineer of the Anglo-Argentine Tramways Company, Buenos Aires, Argentina, is in this country on a short trip of inspection of its electric railway facilities. The Anglo-Argentine Tramways Company is a consolidation of some eight former operating tramways companies in the Argentine capital, and includes a subway as well. Extensions are under consideration, but actual construction will be delayed until the market for materials becomes better.

J. S. Mackenzie, for the last twelve years purchasing agent for the Winnipeg (Man.) Electric Railway, has been appointed assistant treasurer of the company to succeed G. A. Henson. Mr. Mackenzie was formerly with the Toronto (Ont.) Railway. He became connected with the Winnipeg General Power Company in 1902 and remained with that company until 1906, when it was amalgamated with

the Winnipeg Electric Railway. Since that time Mr. Mackenzie has been purchasing agent of the company.

O. J. Gilcreest, assistant to the general superintendent of the Twin City Transit Company, Minneapolis, Minn., in July received a commission as a second lieutenant in the motor truck transportation corps of the marines, attached to the Naval Air Service and was sent to France on very short notice. While studying at the Massachusetts Institute of Technology Mr. Gilcreest specialized on gas engines and it was this special training, along with his general experience, that secured him the position in government service in which he is now engaged.

G. A. Henson, assistant treasurer, has resigned after eighteen years' service with the Winnipeg (Man.) Electric Railway, to take a well-earned holiday. Mr. Henson has been connected with street railway transportation practically all his life. He was first employed by the old horse railway in Winnipeg in 1890. He remained with that company for five years. When the horse cars were superseded by electric cars Mr. Henson went into the insurance business. He became connected with the Winnipeg Electric Railway in 1900 as accountant and three years ago was made assistant treasurer.

James Blaine Walker, secretary of the Public Service Commission for the First District of New York, is the author of "Fifty Years of Rapid Transit," recently published. Mr. Walker has been connected with the commission since its creation more than ten years ago and in the records of that body and its predecessor, the Rapid Transit Commission, has had unusual opportunities open to him for the study of the subject about which he has written. According to Mr. Walker the father of the subway idea was Hugh B. Willson, a Michigan Railway man, who had been in London during the construction of the underground road. Impressed with the workings of the London subway, he conceived the idea of applying the scheme to New York. This attempt failed, but it marked the beginning.

Obituary

Charles H. Killam, who assisted in promoting the Hanover (N. H.) Street Railway, is dead. Mr. Killam was president of the company for some years before the property was taken over by the Bay State Street Railway.

Thomas S. Morris, the first general manager of the old Trenton Horse Railroad, now included in the system of the Trenton & Mercer County Traction Corporation, Trenton, N. J., died on Aug. 13 at his home in the city of Trenton. He was eighty-three years old.

Construction News

Construction News Notes are classified under each heading alphabetically by States. An asterisk (*) indicates a project not previously reported.

Franchises

Norfolk, Va.—The Norfolk Railway & Light Company, which is leased by the Virginia Railway & Power Company, has received a franchise from the Board of Aldermen of Norfolk to construct an extension from the intersection of Granby and York Streets, along York Street to Boush Street, connecting with the present line at Granby and York Streets.

Track and Roadway

***Mena, Ark.**—Plans are being proposed for the construction of an inter-urban electric line from Mena to Hot Springs. H. W. Knight, Chicago, and the Mena Commercial Club are interested in the project.

San Francisco-Oakland Terminal Railways, Oakland, Cal.—Operation has been begun on the Chestnut Street branch of the West Eighth Street car line, constructed for the purpose of providing adequate transportation accommodations for the employees of the Moore Shipbuilding Company. A fan-shaped terminal has been constructed at the foot of Chestnut and Adeline Streets. The line cost approximately \$25,000 to build and is partially under the control of the federal government through the organization of the Emergency Transportation Company. Similar terminals will be built at the Alameda plant of the Bethlehem Steel Corporation and the new Liberty shipyards.

Municipal Railway of San Francisco, San Francisco, Cal.—Traffic congestion at the foot of Market Street will be relieved by the installation of a third loop for the cars of the Municipal Railway and the United Railroads, instead of by the construction of a subway, according to a tentative agreement reached recently by state, municipal and railway officials at a meeting of the State Board of Harbor Commissioners. The proposed loop which would be constructed outside the present loops, would cost approximately \$12,000. It is planned to divide the cost between the Municipal Railway and the United Railroads.

Central of Florida Railway, Daytona, Fla.—Service will be discontinued early in September by the Central of Florida Railway, which operates a line between Daytona, Daytona Beach and Sea

Breeze. The tracks will be torn up and the system dismantled.

***Hilo (Hawaii) Traction Company.**—A contract has been placed by the Hilo Traction Company with the Honolulu Iron Works for \$20,000 worth of equipment for its proposed electric railway system in Hilo. J. W. Russell, president.

Detroit (Mich.) United Railway.—Owing to reduced receipts, the Detroit United Railway has discontinued all construction work under way, including the building of the new Ferndale line to the Ford Eagle plant on River Rouge.

Michigan Railway, Kalamazoo, Mich.—An extension will be built by the Michigan Railway from Morrice to Flint.

Emergency Fleet Railroad, Trenton, N. J.—The Board of Public Utility Commissioners of New Jersey has approved the proposition of the Emergency Fleet Railroad, a part of the United States Emergency Fleet Corporation, to lease a war emergency trolley line from Gloucester City to Newton Creek in Camden, N. J., to the Public Service Railway for the period of the war and six months after the war. The line will be built and operated by the Public Service Railway, and the Public Service Railway will pay annually 5 per cent of the cost of the road as rental to the leasing company. At the close of the war the Public Service Railway will lease the line for 75 per cent of its cost. The line will provide transportation facilities for workers in the shipyards of the New York Shipbuilding Company at Camden and the Pussey & Jones yards in Gloucester City. The cost of the road will be about \$215,947. [July 20, '18.]

North Carolina Public Service Company, Greensboro, N. C.—The North Carolina Public Service Company purposes double-tracking its line from the O. Henry Hotel to the passenger station in connection with the improvement of Elm Street, during the next two or three months. Only a part of this line is now double-tracked. The whole line will be rebuilt.

Portland Railway, Light & Power Company, Portland, Ore.—Plans for additional transportation facilities for the shipworkers on the west side of the Willamette are outlined in a report submitted to Acting Mayor Bigelow by F. I. Fuller, vice-president of the Portland Railway, Light & Power Company. These plans are extensive and to carry them out the company will receive assistance from the federal government. Loops for switching cars are planned in connection with the North and South Portland lines at points nearest the South Portland shipyard center and

also adjacent to the industrial center in North Portland, so that the armies of workers may be handled with greater facility. A loop to relieve the congestion on the standard-gauge lines on First and Second Streets is planned on Yamhill Street, so that cars may be looped from Second to First Street.

Lehigh Valley Transit Company, Allentown, Pa.—Improvements are being made by the Lehigh Valley Transit Company on its line from Slatington to Slatedale.

Harrisburg (Pa.) Railways.—Construction has been completed by the Harrisburg Railways of a new extension to its traction system west of Harrisburg.

Quebec Railway, Light & Power Company, Quebec, Que.—It is reported that as soon as estimates are completed showing the materials required, construction will be begun on the proposed extension of the line of the Quebec Railway, Light & Power Company along the Beauport Road, from Limoilou to the city limits. It is also reported that the company will take over the spur line from Mastai Station to Beauport Asylum and operate it in conjunction with its system.

Dallas (Tex.) Railway.—Work has been begun by the Dallas Railway on the rehabilitation of its line which serves Highland Park and the Southern Methodist University.

Shops and Buildings

Pacific Electric Railway, Los Angeles, Cal.—A new waiting station will be built by the Pacific Electric Railway at Glendale Avenue and Broadway, Glendale.

Piedmont & Northern Railway, Charlotte, N. C.—The passenger station of the Piedmont & Northern Railway at Paris, S. C., was recently destroyed by fire.

Power Houses and Substations

Potomac Electric Power Company, Washington, D. C.—The Potomac Electric Power Company, which is controlled by the Washington Railway & Electric Company, has recently offered through bankers \$2,100,000 in bonds to provide funds for the extension of improvement of its electric generating and transmitting facilities.

Rutland Railway, Light & Power Company, Rutland, Vt.—Negotiations have been completed by the Rutland Railway, Light & Power Company with the War Industries Board for the use of the waters of Bomoseen Lake, amounting to approximately 700,000,000 cu.ft. for power purposes.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS

FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES • MARKET QUOTATIONS • BUSINESS ANNOUNCEMENTS

No Rails for Electric Lines

Further Curtailment of Iron and Steel Supplies for Electric Railway Uses Is Expected

The continued reduction in the quantity of steel available for electric railway uses renders the shortage more acute as the requirements of the government for this material increase. The government recently announced that it would require the entire capacity of the steel and iron mills for the next eight months in order to meet its own and the Allies' needs. General Pershing has now called for additional quantities of equipment which will involve a large tonnage of steel beyond the estimates then given.

GOVERNMENT TAKING ALL RAILS

This increased demand has changed the operating schedules of the mills greatly. Urgent calls have been received from overseas for rails, rolling stock and shell steel and as a result some of these intended for home use may have to be shipped abroad.

Steel mills are rolling some T-rails, but these are mostly 80-lb. and larger sizes, and are rails all being taken by the government. The manufacturers report that they have unfilled orders on their books, some of which are two years old and they still cannot tell when they can fill these orders. Government demands for rolled steel and forged and cast steel products over the second half of this year now amount to 23,000,000 tons, according to Washington reports, and the possibility is that with the additional tonnage needs of the Allies 25,000,000 tons will be wanted. Such a tonnage, however, is entirely beyond the ability of the steel mills to roll this year, but an effort is to be made further to increase the output of crude steel in the next few months and this means also an increase in the output of pig iron. It is hoped to remedy the situation and reduce the shortage of steel somewhat by shutting off all further steel shipments to industries other than those engaged in meeting war needs.

FEW SPECIAL WORK ORDERS

Special-work manufacturers report that no orders are being received from electric railways except for repair parts, and from properties on which track extensions to government plants, shipyards, camps, etc., are being made or where changes in track are necessary in rerouting cars to accommodate government traffic. These are being filled where the manufacturers have the necessary rail in stock and the

roads have to take what the manufacturers have on hand or else supply the rail themselves. Where roads previously insisted on a particular design of special work they now must take what can be supplied.

Prices are high, but they correspond with the present material and labor costs.

Car Shortage Decreases Coal Output

Output for the Week of August 17 the Lowest That Has Occurred Since June 22 of This Year

According to the weekly report of the United States Geological Survey dated Aug. 24, the decrease in the total production of bituminous coal, including coal coked which began after the record week of July 13, not only continued during the week of Aug. 17 but the output during that week also fell below 12,000,000 net tons for the first time since June 22. Preliminary estimates place production (including lignite and coal coke) during the current week at 11,910,000 net tons, a decrease compared with the week of Aug. 10 of 379,000 net tons, or approximately 3 per cent, but an increase over the corresponding week of 1917 of 1,597,000 net tons, or 15.4 per cent. The production necessary during the balance of the summer weeks to make up for the past deficit now amounts to 14,275,000 net tons or approximately 21 per cent in excess of the average weekly production during the coal year to date.

Shipments decreased during the week from all districts with the exception of western Pennsylvania, Tennessee, Kentucky, Alabama and the Rocky Mountain and Pacific Coast States. Compared with last year, however, all districts show improvement. The limiting factor during the week was car shortage, the operators reporting a loss of 9.8 per cent of full time from this cause as against 7.7 per cent during the week preceding. Slight improvement is reported in labor conditions and slightly less mine disability existed during the week, while lack of market in the Rocky Mountain district caused slightly greater loss of time than during the preceding week. The mines are reported as being operated at 79.7 per cent of full time as against 82.3 per cent during the week preceding. Operating conditions in the by-product industry and gas plants generally show a slight shortage of by-product coal, causing the plants to be operated at 90 per cent of their present capacity as against 91.5 per cent during the week of Aug. 3.

New Draft Law and Industry

Manufacturers and Railway Companies Want to Know How Its Application Will Affect Their Staffs

Probably before this note is published the new draft law will have been passed and signed by the President. Under it all men between the ages of eighteen and forty-five not now in military service will be subject to call. The selective principle is retained, but the law itself says nothing about classes to be exempted.

The prospective passage of the law has stirred industry as has nothing since the war began. How will the selective principle be applied? Evidently the line will be drawn tighter than ever between the essential and non-essential industries. In other words, the "Work or fight" principle will apply, but in the electric railway and the allied manufacturing industries, which have been recognized as "essential," what effort will the government make to protect itself by retaining in the industries the men who are carrying the burdens of those industries—who furnish the executive brains, the energy and the enthusiasm? A great many of these men are between thirty-five and forty-five. At the same time their abilities have enabled them to accumulate enough to have an independent income if they have no dependents. Needless to say, the withdrawal of these men would be a calamity if it should mean any serious impairment of the industrial or war efficiency of the properties in their charge. This is especially the case if a group of prominent executives should be taken from any one property, either railway or manufacturing.

Certain it is that our industrial structure, under the easiest conditions, must suffer a very considerable alteration; this is to be expected. But the country would be better off if business men can be informed quickly of the government's policy. Certainty should succeed uncertainty as quickly as possible. Only so can preparations be made for taking care of our industrial enterprises. The time for adjustment is all too short in any event.

A general policy needs to be declared. If interpretation is left to the local draft boards, the results to the industries and the government may be serious.

So far the government has applied the selective draft principle intelligently. The confidence created in the government and in the Secretary of War should be retained by a frank declaration from the Secretary to the business men of the country at once.

Inquiries for Rolling Stock Increase

Roads Need Additional Equipment and with Reasonable Delivery Many Orders Would Be Placed

Inquiries made of car builders regarding the car situation in the West indicate that inquiries for additional cars have been quite numerous recently and have increased decidedly as compared with the latter part of last year and the first four months of this year. Manufacturers report that the present demand exceeds the supply. This, of course, is not due to the large number of cars being purchased, but can be directly attributed to the large amount of government work now going through the various plants. Judging from the number of inquiries received for new equipment, it appears that the purchase of electric traction rolling stock will increase from now on. Many roads need additional equipment and owing to the increased fare which has been allowed some will buy that otherwise could not afford to do so.

It is interesting to note the almost spontaneous recognition of the "one-man" car in the Middle West, West and Southwest. One manufacturer states that fully 90 per cent of this year's inquiries for city cars has been for the "one-man" unit. Car builders feel that the merit of the one-man unit is now absolutely proven and generally admitted. After the war the demands on the car builder are sure to be very heavy and it would not be surprising to see several thousand one-man cars purchased within a very short time after the conclusion of the war.

The impression conveyed by these inquiries indicates that the outlook is exceedingly bright, and if material could be obtained promptly the car builder with the necessary man-power and capacity would be kept very busy.

Locomotive Manufacturing Facilities to Be Increased

At a meeting of representative locomotive builders this week with Bernard M. Baruch, chairman of the War Industries Board, and other officials of the board, the Railroad Administration and the government departments, plans were worked out whereby the output of the American locomotive manufacturing plants will be doubled. The increase is from more than 3000 on a pre-war basis to more than 6000 completed machines. An equable distribution of the output to meet the military needs in France and the needs of the Railroad Administration for the steam roads of the United States has been provided by the chairman which has met the approval of the officials.

Among those attending the meeting were Samuel Vaucain, of the Baldwin Locomotive Company; Mr. Fletcher, president of the American Locomotive Company; Mr. Lassiter, general manager of the American Locomotive Company; Colonels Tyler and Wright, of

the Army Engineers Corps; Assistant General Manager Hines, Director of Operations Gray and Director of Railroad Equipment J. R. Flannery, of the Railroad Administration, and Henry Rea, of the Committee on Munitions and Plants.

Sawdust-Bricks for Fuel

Sawdust bricks for fuel are just now receiving close attention at the Forest Products Laboratory of the State University. The shortage-of-coal problem, which threatens to inflict itself upon the country next winter, has caused a revival of interest in the possibilities of successfully briquetting sawdust and shavings so they will compete commercially with other fuels, and thus aid in the relief work which may become necessary.

In the past such processes have been successful so far as heating qualities were concerned, but have been rather too expensive, so that there is no established industry of the sort in the United States at the present time.

The usual method of compressing sawdust into briquettes is by the aid of pitch or tar as a binder in suitable machines. At one time machines were used in the West in which, instead of a pitch binder, string was wrapped around the briquette, and held the sawdust in shape until it was used for fuel.

Jobbers in Electrical Goods on Preferential List

The War Industries Board authorizes the following:

At a hearing before the Priorities Commissioner and other representatives of the War Industries Board, the war service committee representing electrical jobbers presented their claims for preferred treatment to maintain their stocks for general distribution.

As a result of the hearing the Priorities Commissioner announced that manufacturers of electrical apparatus and supplies will be accorded a degree of preference for their materials to enable them to operate, conditioned upon their pledging themselves to limit their output to essential products and undertake to see that such products are devoted solely to essential uses as that term may be defined from time to time by the Priorities Division. The manufacturers must be relied upon to police their own industry and also in a measure to police jobbers.

It is believed to be in the public interest that jobbers should be permitted to maintain reasonable stocks from which government agencies, war industries and the civilian population may draw for their necessary essential requirements, provided that the jobbers will pledge themselves rigidly to restrict the use of all stocks to solely essential uses and to reduce to an absolute minimum both jobbing and retail stocks. The jobbers will be relied upon to police their own industry and that of the retailers. Any jobber or retailer violating the pledge will be cut off from procuring further supplies.

Packing Goods for Export Needs Attention

The Large Amount of Handling Necessary Makes it Imperative to Use Stout Shipping Cases

Special Agent S. W. Rosenthal, in an article published in *Commerce Reports*, says that too much care cannot be used in packing goods for some interior points in South America as revealed by a brief description of the handling they undergo in a trip from New York to La Paz, Bolivia. As an illustration, twenty-five cases of envelopes were loaded on a truck in New York and unloaded at the steamship pier. They were then placed on board the steamship and unloaded at Colon, Panama. They were re-embarked on a steamer at Colon and transferred to a launch at Mollendo, since there are no piers at this port. They were taken on shore from the launch, transferred to handcarts, and taken to the railroad station. They were placed on a freight car and unloaded at Guaci, Lake Titicaca. At Guaci they were placed aboard a steamer and taken to Puno; here they were unloaded from the steamer and placed on the railroad cars, which transferred them to La Paz. At La Paz they were carried by Indians to the customer's warehouse.

It is obvious that if merchandise is to be received in La Paz in satisfactory condition the packing must be done with special care. Both merchants and custom-house brokers report that the best preventive for damage and rifling is to pack the merchandise in a stout shipping case, nail metal edging around the ends and finally paint the edging so that it will show marks if tampered with. This, they report, makes a fool-proof shipping case.

The marking of cases must also be plain and large enough to be easily made out in the hold of a ship.

Rolling Stock

Rock Island Southern Railroad, Monmouth, Ill., is reported to have lost several cars in a fire which destroyed the company's power house and shops at Cameron, Ill.

Laconia (N. H.) Street Railway has ordered two one-man safety cars from the American Car Company, St. Louis, Mo. These cars are of the standard double-end Birney type.

The City of Seattle, Wash., has purchased from the Twin City Rapid Transit Company, Minneapolis, the twenty-five second-hand double-truck cars for which it was in the market.

Hammond, Whiting & East Chicago Railway, Chicago, Ill., is in the market for ten new cars. The order is before the United States Housing Corporation for approval. The corporation will finance improvements of approximately \$325,000, including cars and 2 miles of new track for the transportation of munitions workers.

Kansas City (Mo.) Railways has secured fifteen cars for one-man operation from the American Car Company. They are to be delivered in ninety days. The cars are part of a lot ordered by an Eastern company which has released them. The total cost is about \$100,000.

The Connecticut Company, New Haven, Conn., has been granted permission by the Public Utilities Commission to operate twenty-one one-man cars. These will be used on one or more "jigger" lines and, according to the local papers, the street carmen's union will interpose no objection to their use.

Washington-Virginia Railway, Washington, D. C., has applied to the Capital Issues Committee at Washington for authority to issue and market \$420,000 of short-term equipment notes to provide fifty new cars for the Mt. Vernon & Camp Humphries Railway, an extension of 4 miles which is being completed from Mt. Vernon to Camp Humphries, Va. The roadbed and track are nearing completion, and it is expected that the new line will be ready for use some time in September. Anticipating approval of the application, the contract for the cars has been awarded.

Trade Notes

Metal & Thermit Corporation, New York, N. Y., announces that the Toronto office of the company has been moved to 15 Emily Street, Toronto, Ont.

H. L. Lewrabey, estimating and efficiency engineer, St. Louis Car Company, has become a member of the central bureau staff, Division of Planning and Statistics, War Industries Board, with headquarters at Washington.

Walter A. Zelnicker Supply Company, St. Louis, Mo., has recently added to its sales force Henry Stroh. For the last ten years Mr. Stroh has been connected with the Elliot Frog & Switch Company. Prior to that he was associated with the Republic Iron & Steel Company, East St. Louis. The Zelnicker Company has also recently secured the services of Merle G. Peterson, who is now connected with the company's Chicago sales force at 428 First National Bank Building. Mr. Peterson was formerly associated with the Niles-Bement-Pond Company and Pratt & Whitney Company.

New Advertising Literature

Wheeler Condenser & Engineering Company, Carteret, N. J.: Bulletin 112A, entitled "Condensers, Pumps, Cooling-Towers, etc.", 32 pages, descriptive of the products along these lines of the manufacturers.

Pittsburgh (Pa.) Glove Manufacturing Company: A catalog describing and illustrating its high-tension glove. These gloves consist of a tough extra-flexible rubber of great strength, of

high dielectric properties, protected by genuine horsehide gloves, according to this bulletin. The two permit free and unrestricted use of the hands.

Mica Insulator Company, New York, with works at Schenectady, N. Y.: A bulletin entitled "The Insulation of Commutators," containing facts relative to this subject and a discussion of insulation in general. Early methods of insulation are also discussed and a résumé of the invention of "Micanite" is given. Mica films, cement content of Micanite and the different kinds of mica plate are also treated of. The characteristics of "Micanite," including its uniform thickness and density, high specific weight, extremely low compressibility, very small cement content and large area of individual mica films, are also outlined.

St. Louis Frog & Switch Company, St. Louis, Mo.: A 280-page indexed catalog, 5 in. x 7 in., with semi-flexible cover, containing much valuable information for electric railway maintenance of way engineers. The first part of the volume is devoted to general information, diagrams, definitions and dimensions pertaining to switches, crossings frogs, switch stands, track elevation, standard rail sections, ties, bolts, spikes, curving of rails, decimal equivalents, etc. The remainder of the book includes a chapter treating extensively by the aid of many diagrams each of the following subjects: Frogs, Switches, Crossings, Special Track Work, Switch Stands, and Track Work for Industrial Railways.

NEW YORK METAL MARKET PRICES

	Aug. 21	Aug. 28
Copper, ingots, cents per lb.	26	26
Copper wire base, cents per lb.	29.25	29.25
Lead, cents per lb.	8.05	8.05
Nickel, cents per lb.	40	40
Spelter, cents per lb.	9.12½	9.00 to 9.25
Tin, Chinese, cents per lb.	90 to 90.5	90 to 90.5
Aluminum, 98 to 99 per cent., cents per lb.	133.00	133.10

* No Straits offering. † Government price in 30-ton lots or more, f. o. b. plant.

OLD METAL PRICES—NEW YORK

	Aug. 21	Aug. 28
Heavy copper, cents per lb.	24.00	23.50 to 24.50
Light copper, cents per lb.	20.50	20.10 to 21.50
Red brass, cents per lb.	21 to 22	22 to 23
Yellow brass, cents per lb.	13½ to 14½	13½ to 14.50
Lead, heavy, cents per lb.	7.00	7.50 to 7.75
Zinc, cents per lb.	6.00	6.75 to 7.00
Steel car axles, Chicago, per net ton.	\$41.52	\$41.52
Old carwheels, Chicago, per gross ton.	\$29.00	\$29.00
Steel rails (acrap), Chicago, per gross ton.	\$34.00	\$34.00
Steel rails (relaying), Chicago, gross ton.	\$60.00	\$60.00
Machine shop turnings, Chicago, net ton.	\$16.25	\$16.25

ELECTRIC RAILWAY MATERIAL PRICES

	Aug. 21	Aug. 28		Aug. 21	Aug. 28
Rubber-covered wire base, New York, cents per lb.	30 to 37	30 to 37	Galvanized wire, ordinary, Pittsburgh, cents per lb.	3.95	3.95
Weatherproof wire (100 lb. lots), cents per lb., New York	32.40	32.40	Car window glass (single strength), first three brackets, A quality, New York, discount.	80%	80%
Weatherproof wire (100 lb. lots), cents per lb., Chicago	35.00 to 37.72	35.00 to 37.72	Car window glass (single strength, first three brackets, B quality), New York, discount.	80%	80%
T rails (A. R. C. E. standard), per gross ton.	\$70.00 to \$90.00	\$70.00 to \$80.00	Car window glass (double strength, all sizes AA quality), New York discount.	82 & 3%	82 & 3%
T rails (A. R. C. E. standard), 100 to 500 ton lots, per gross ton.	\$67.50	\$67.50	Waste, wool (according to grade), cents per lb.	11½ to 22	11½ to 22
T rails (A. R. C. E. standard), 500 ton lots, per gross ton.	\$62.50	\$62.50	Waste cotton (100 lb. bale), cents per lb.	13 to 13½	13 to 13½
T rail, high (Rhonghai), cents per lb.	4½	4½	Asphalt, hot (150 tons minimum), per ton delivered.	\$38.50	\$38.50
Rails, rdgr (grooved), cents per lb.	4½	4½	Asphalt, cold (150 tons minimum, pkgs. weighed in, F. O. B. plant, Maurer, N. J.), per ton.	\$42.50	\$42.50
Wire nails, Pittsburgh, cents per lb.	3½	3½	Asphalt filler, per ton.	\$45.00	\$45.00
Railroad spikes, drive, Pittsburgh base, cents per lb.	4½	4½	Cement (carload lots), New York, per bbl.	\$3.20	\$3.20
Railroad spikes, screw, Pittsburgh base, cents per lb.	8	8	Cement (carload lots), Chicago, per bbl.	\$3.34	\$3.34
Tie plates (flat type), cents per lb.	0½	0½	Cement (carload lots), Seattle, per bbl.	\$3.68	\$3.68
Tie plates (beave type), cents per lb.	0½	0½	Lined oil (raw, 5 bbl. lots), New York, per gal.	\$1.86	\$1.86
Tie rods, Pittsburgh base, cents per lb.	7	7	Lined oil (boiled, 5 bbl. lots), New York, per gal.	\$1.88	\$1.88
Fish plates, cents per lb.	0½	0½	White lead (100 lb. keg), New York, cents per lb.	10½	10½
Angle plates, cents per lb.	0½	0½	Turpentine (bbl. lots), New York, cents per gal.	63	63
Angle bars, cents per lb.	0½	0½			
Rail bolts and nuts, Pittsburgh base, cents per lb.	4.90	4.90			
Steel bars, Pittsburgh, cents per lb.	5	5			
Sheet iron, black (24 gage), Pittsburgh, cents per lb.	4.90	4.90			
Sheet iron, galvanized (24 gage), Pittsburgh, cents per lb.	5.80	5.80			
Galvanized barbed wire, Pittsburgh, cents per lb.	4.35	4.35			

* Government price. † These prices are f. o. b. works, with boxing charges extra.



Hundreds of Peacock Brakes in the Great Northwest

SEATTLE, Tacoma, Portland — the three great cities of the Northwestern Coast—all have grades that look like the ascent of young mountains.

And between them these three cities have hundreds of Peacock Brakes—and have had them for years.

Is it likely that roads like these would have selected and held on to the Peacock unless its reliability was beyond all question?

Their combined judgment as to the hand brake for their *real* grades is worth your attention.

The Peacock makes good on the hills and on the level.

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tion of the Electric Railway Journal would be appreciated.

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This is the bond that when welded to your rail joint shows a saving of 25-35 cents per bond. We prove this saving over any other method.

THE Lincoln Bonding Machine is a traveling repair shop. Under present conditions worn and broken parts have to be used until new parts can be received.

The quickest and simplest way is by the use of a Lincoln Bonding Machine.

Any and all kinds of metallic and carbon welding made easy.

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To Employers and Important Executives—

A GOVERNMENT PROCLAMATION

THE ARMY NEEDS YOUR INFLUENCE IN AN EMERGENCY—

This is a man-to-man appeal for you to help the Government grasp a great opportunity, and for you to discharge a grave responsibility.

The Allied program to speed up the war and quickly bring about the final overthrow of the German Armies calls for an immediate mustering of America's final contribution of manpower. We must raise our army to 5,000,000 men at once!

Nearly 3,000,000 of the needed 5,000,000 are already under arms—but Class 1 of the Draft will be exhausted by October 1. To go into the deferred classification and take men essential to industries, and men with dependent families, is unwise.

A new Class 1 must be created at once. Laws are being framed calling upon men within certain ages to register (the War Department's recommendation is for 18 to 21 and 32 to 45 years as the age limits), and the President will appoint a Registration Day early in September.

Thirteen million men must register in a single day. Later these men will be classified. Industries will not lose men who are absolutely essential to them, and families will not lose their bread-winners. But every man must register.

You are a center of influence

As an employer or an important executive you are a center of influence, and the Government needs your active co-operation in putting through this gigantic task without confusion or delay. Thirteen million men must be told of the law between now and Registration Day (watch newspapers for date) and they must understand the *why* of it, and just *where* and *how* they are to register. For these details ask your Local Board, or your city or county clerk.

You can reach the men in your employ more effectively than they can be

Watch the newspapers for the date and further details

reached from the outside. We earnestly urge, therefore, that you make definite plans, in the interest of a speedy VICTORY, and in the interest of your own business, to see that all of your men are properly informed, so that they can be promptly and correctly registered when the day comes.

Every man between the ages to be specified in the President's Proclamation must register.

How you can help

Start at once to get in touch with your men. Bring to their attention the need for the registration and the facts about it. Get in touch with your Local Registration officials and co-operate with them.

Here are a few suggestions:
Arrange for talks to your men; place inspirational and informative bulletins on bulletin-boards; establish Selective Service Information Bureaus; inclose slips in your men's pay envelopes.

Arrange for definite hours when the men in the different departments or sub-divisions of your business shall be allowed time to go and register. Post full lists of the men in your employ between the specified ages, the men to check off their names after they have registered.

Many other ideas, applicable to your own business, will doubtless occur to you.

This is an emergency such as this country has never faced before, and the Government must depend upon you to bring all of your influence and inspiration and ingenuity to bear out this problem, that this crisis in the war may be met in a way that shall avoid hardship to the businesses and families of the Nation.

Signed:

E. H. CROWDER,

PROVOST MARSHAL GENERAL

Approved:

NEWTON D. BAKER,

SECRETARY OF WAR



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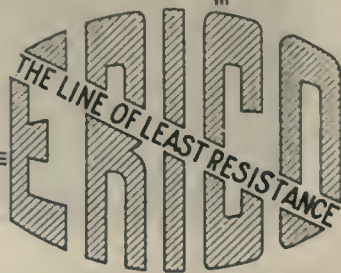


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One apparatus that will do two things well, soon makes its value felt in any shop. The Erico is in this class. It is an efficient, rapid arc welder and has equal value as a rail bonder.

*Let us send you full details of
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For Street and Interurban Railways.

We have adequate facilities at each foundry for mounting wheels on axles.

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Built as accurately as ammunition —

NOARK

RENEWABLE FUSES

Just as a cartridge is made accurate to a hundredth of an inch and charged to a fraction of a grain, so are "Noark" Renewable Fuses a product of the higher mathematics of experience.

A dozen exclusive features make this new member of the "Noark" family a better and a safer renewable fuse for your circuits. The knife blades are rigid and in perfect alignment—there is no wobble and no heating because contacts are positive and ample in area. Special venting design insures the ferrules from freezing tight even on heavy shorts and by the same rule insures long life of the casing.

All the way through you will find improvements in the mechanical and electrical design—improvements which are responsible for our saying it is the best renewable fuse on the market.

H. W. JOHNS-MANVILLE CO.
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Please Be Skeptical

Here are two flat statements—too important to take on faith. Challenge us to prove them.

1. The "FRANKLIN" Disconnecting Switch with Positive "FRANKLIN" Lock not only resists electrical expulsion strains but locks tighter as the strains increase.
2. A single pull, from any angle with any kind of hook, will open it readily.

Fully described in Bulletin No. 1250. In writing, state service and voltage.

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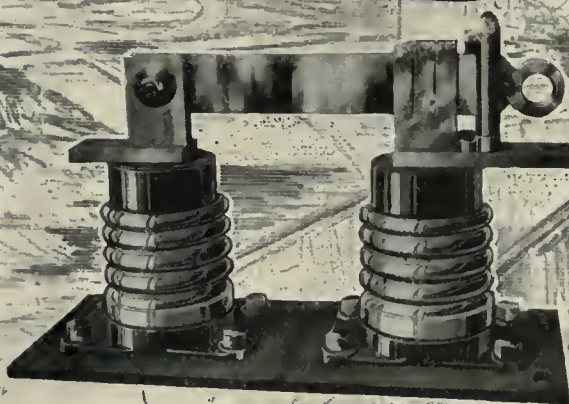
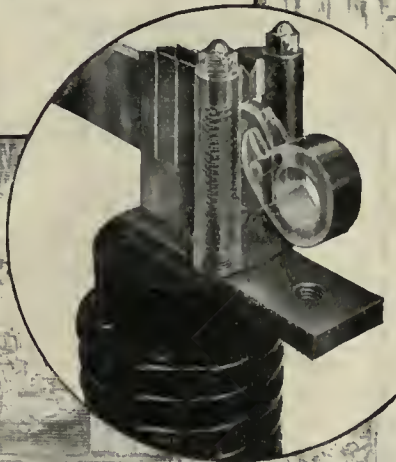
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The saving in power and in oil cost is not inconsiderable in accurately machine-cut and carefully heat-treated gears.

The great ultimate economy of gears that wear has led many operators to use gears made from

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in order to secure the highest standard of gear efficiency.

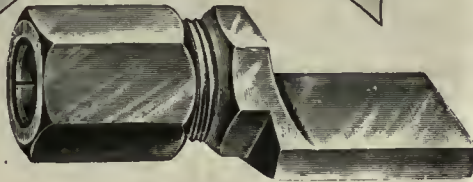
The careful refinement of structure of these gears produces a strength and toughness that gives them superior wearing qualities.

The slight extra cost of these gears will be repaid nine times over in the saving in first cost alone of cast steel gears.

Use gears made from Carnegie Rolled Steel Blanks for real economy and satisfaction.

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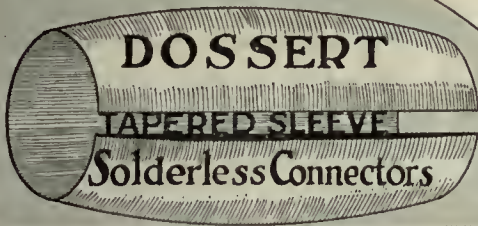
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Used for connecting wires and cables to flat buses or front-connected switches, and for terminals on large machines used in the generation and conversion of current. Consult the Dossert Catalog for other types of lugs.

The Tapered sleeve assures absolute contact

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SWITCHES, FROGS AND CROSSINGS.
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SWITCHES.



TRACK WORK
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Double-track spacing and clearance signals
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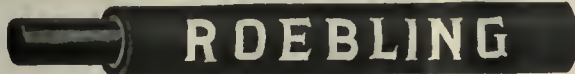
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Automatic Safety and Automatic Return Switch Stands for Passing
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High Grade Insulated Wires and Cables, Bare Iron,
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A positive locking switch lock that locks right and left.
Waterproof, non-freezable, mud-proof and sand-proof.
Simple in construction, perfect in operation and easily in-
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Write for complete information and quotations.

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Commit us to memory.

"NATIONAL"

TUBULAR STEEL POLES

FOR MODERN ELECTRIFICATIONS

NATIONAL TUBE CO., PITTSBURGH, PA

EUREKA PRODUCTS

Commutators, Trolley Wheels, Sleet Trolley Wheels,
Trolley Ears, Lina Material, Controller Fingers, Brush
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We make quality goods.

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Peirce Forged Steel Pins with Sheet Steel Thimbles

Your best insurance against insulator breakage

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AETNA INSULATION LINE MATERIAL

Thirt Hall Insulators, Trolley Bases, Poles, Harps and Wheels,
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Sawson Splices—"Least cost per car Mile."
Drew Frogs and Crossings—Obviate "trolley off."
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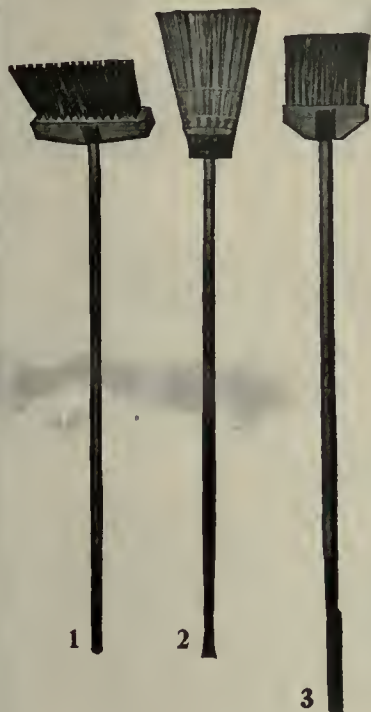
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ALBANY, N. Y.

CONSULT OUR ENGINEERS ON YOUR
SIGNAL REQUIREMENTS22 Vanderbilt Avenue, New York Monadnock Block, Chicago
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A Great Combination



No. 1 to sweep crossings.

No. 2 to handle light dirt and snow in the frogs, switches, and curves.

No. 3 to remove ice, slush and mud from the same places and a chisel point on the end of the handle to loosen the ice and crust.

No. 1 and No. 3 contain Flat Steel Tempered Wire, and nothing superior can be produced. Serviceable all the year round. Your road is not complete without them.

Write for Prices.

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HIGHEST QUALITY

TRACK SPECIAL WORK



WE MAKE THIS GRADE ONLY

CLEVELAND FROG & CROSSING CO.
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WE-FU-GO AND SCAIFE

WATER

PURIFICATION SYSTEMS
SOFTENING & FILTRATION
FOR BOILER FEED AND
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WM. B. SCAIFE & SONS CO. PITTSBURGH, PA.

Foster Superheaters

Insure uniform superheat at temperature specified

Power Specialty Company

111 Broadway, New York City

32 ft. of
12 in.
"ACMES"
on the way
to the ditch.
Easily
handled in
a wheel-
barrow.

One Man—
can load and unload and install all the usual sizes of
"ACME" (NESTABLE) CORRUGATED CULVERTS
Made of
Galvanized Anti-Corrosive NO-CO-RO-METAL
Long coupled wagons and big gangs of men,
with a big percentage of idle time, are not neces-
sary with "ACMES."
However when conditions make it desirable we'll ship
"ACMES" Set-up in full circle form.

THE CANTON CULVERT & SILO CO.
MANUFACTURERS
CANTON, OHIO, U.S.A.

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Established 1858

Manufacturers of

Special Work for Street Railways

Frogs, Crossings, Switches and Mates

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Kerwin Portable Crossovers

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Business not as usual

Think a Bit
of the relation of Railroads
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If you know anything Good
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TALK ABOUT IT

Otherwise—don't talk
Boost the Railroads and
Win the War

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WATER TUBE STEAM BOILERS

Steam Superheaters Mechanical Stokers

Works: BARBERTON, OHIO—BAYONNE, N. J.

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We specialize in the
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**High Grade
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For Railway Equipment
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SAGINAW, MICH.

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There is an old story of a Duchess who, reduced to poverty, took to selling fish.

A false pride kept her from calling her wares until they announced themselves—by their odor.

MORAL: Don't hang on to second hand equipment until it is fit only for the junk heap. Advertise it in the

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MACHINE TOOLS

For Electric Railway Repair Shops

Ashe Lathes
Wheel Presses
Shapers, Drills
Slotters, Planers
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Send
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Catalogs

Full power with
High or Lower Adjustment

Many emergencies requiring a powerful jack present a difficulty in bringing the jack to bear on the load. The

Buckeye Emergency Jack No. 239 Special

saves time, strength and trouble. The many positions to which it is adjustable easily solve perplexing lifting problems. Full details in our catalog. Write for it.

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JACKS

Barrett Track and Car Jacks
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IMPERIAL WELDING AND CUTTING EQUIPMENT

OXY-ACETYLENE PROCESS

Welds everything in metal—cuts anything in steel or wrought iron. Excels in Speed, Safety, Efficiency and Economy. Write for Free Catalog.
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GREEN CHAIN GRATE STOKERS

For Water Tube and Tubular Boilers

GREEN ENGINEERING CO.

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Router No. 1—Green Chain Grate Stokers
Router No. 2—Geco Steam Jet Ash Conveyors

INSULATING TAPE

of
Quality
STANDARD
Woven Fabric Co
Walpole, Mass

"It Behooves You to Hooverize Your Motormen"

We can help you

Write to

The Arthur Power-Saving Recorder Co.
2nd National Bank Bldg., New Haven, Conn.

The Kalamazoo Trolley Wheels

have always been made of entirely new metal, which accounts for their long life WITHOUT INJURY TO THE WIRE. Do not be misled by statements of large mileage, because a wheel that will run too long will damage the wire. If our catalogue does not show the style you need, write us—the LARGEST EXCLUSIVE T R O L L E Y WHEEL MAKERS IN THE WORLD.



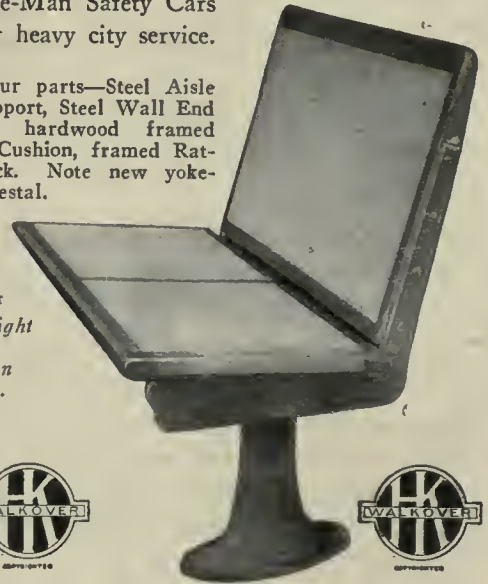
THE STAR BRASS WORKS
KALAMAZOO, MICH., U. S. A.

Hale and Kilburn No. 108

for One-Man Safety Cars
and for heavy city service.

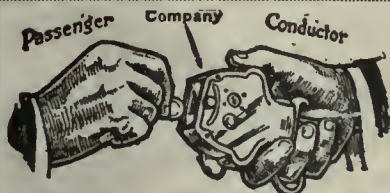
Only four parts—Steel Aisle End Support, Steel Wall End Support, hardwood framed Rattan Cushion, framed Rattan Back. Note new yokeless pedestal.

The No. 108 is only One-half the Weight of Seats with Iron Castings.



Hale and Kilburn Corp.

Philadelphia New York Chicago Washington
Atlanta San Francisco Detroit Louisville



Direct Automatic Registration
By the Passenger
Rooke Automatic Register Co.
Providence, R. I.



Car Heating and Ventilation

is one of the winter problems that you must settle without delay. We can show you how to take care of both, with one equipment. Now is the time to get your cars ready for next winter. Write for details.

The Peter Smith Heater Company
1725 Mt. Elliott Ave., Detroit, Mich.

WE CAN CUT YOUR COST OF HEATING CURRENT

Write for THERMOSTATIC CONTROL INFORMATION

GOLD

ELECTRIC HEATERS Cut Installation and Maintenance Charge.

VENTILATORS Also Ventilate in Stormy Weather. THERMOSTATS Save Current.

ORIGINATED the use of NON-CORROSIVE Wire for Electric Car Heaters.

ORIGINATED The Ventilated Coil Support.

LET US FIGURE ON YOUR NEXT REQUIREMENTS
Gold Car Heating & Lighting Co., 17 Battery Pl., New York

The Big Three

D & W Fuses, Deltabeston Wire
D & W Oil Fuse Cutouts
D & W Fuse Co., Providence, R. I.

Simplex Jacks

for Railroads-Contractors-Industries
Automobiles-Pole Pulling and Ordnance

Templeton, Kenly & Co., Ltd.
London Chicago Paris

FORD TRIBLOC

A Chain Hoist that excels in every feature. It has Planetary Gears, Steel Parts, 3/2 to 1 factor of Safety. It's the only Block that carries a five-year guarantee.

FORD CHAIN BLOCK & MFG. CO.
Second and Diamond Sts., Philadelphia



"Everything in Insulation"

Mica Waxes
Vulcanized Fibre Asphalts
Varnished Cloth Compounds
Insulating Tapes Insulating Varnish

The above are only a few of our products
Write us for anything in this line you may require.

MITCHELL-RAND M'F'G CO.
103 John St., New York City

International Specialties Cover the Entire Range of Fare Collection

Money-counting fare boxes; Coin and metal ticket-counting fare boxes; Coin registers; Coin and transfer registers; Coin, metal ticket and transfer registers; Motor-driven coin and transfer registers; Motor-driven registers for station, ferry, park and terminal use; Metal and paper registers with single hopper; Round and square registers; Transfer printers; Heeren Enamelled Badges; Punches and Bell Cord.

The International Register Company
15 South Throop Street, Chicago

TROLLEY POLES

OUR stock of over 7000 high carbon steel poles is at all times available for immediate shipment.

These poles are of high-grade special skelp, properly reinforced, and will sustain a wheel pressure of from 35 to 40 pounds without taking a permanent bend.

The increasing price of steel makes it to your interest to buy from stock.

NUTTALL
PITTSBURGH L

Consolidated High Grade Products

Electric car heaters—thermostatic control—pneumatic car door operators—buzzers, single-stroke bells, starting signal lights—special resistances.

CONSOLIDATED CAR HEATING CO., Albany, New York

75% of the electric railways

use

B-V Punches

Send for catalog

BONNEY-VEHSLAGE TOOL CO., Newark, N. J.



Heating and Ventilating

Let us demonstrate to you how we can heat and ventilate your cars at the lowest possible cost.

The Cooper Heater Company
Carlisle, Pa.

RAILWAY UTILITY COMPANY

Sole Manufacturers

"HONEYCOMB" AND "ROUND JET" VENTILATORS for Monitor and Arch Roof Cars, and all classes of buildings; also ELECTRIC THERMOMETER CONTROL of Car Temperatures.

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Chicago, Ill.

Write for
Catalogue

1328 BROADWAY
New York, N. Y.

Bonham Traffic Recorders

Show origin and destination of every fare collected as well as other valuable traffic data.

The Bonham Recorder Co., Hamilton, O.



Use them in your terminals—**PEREY TURNSTILES** or **PASSIMETERS**

Faster than the ticket seller

Perey Manufacturing Co., Inc.
30 Church Street, New York City

UNIVERSAL ANTI-SLIP TREADS
cars and station steps.

Universal Safety Tread Company
Waltham, Mass.

The "Nycap-Exide" Battery
for
STORAGE BATTERY STREET CARS
THE ELECTRIC STORAGE BATTERY CO
PHILADELPHIA



SEARCHLIGHT SECTION

ROTARY CONVERTERS

- 1—300-kw. Westinghouse Rotary Converter, 3-ph., 60-cy., 370-v. A.C., 575-v. D.C., 600 r.p.m.
3—300-kw. General Electric, 3-ph., 60-cy., 600-v., 1200 r.p.m. Rotary Converters with transformers.

TRANSFORMERS

- 3—750-kw. General Electric, 60-cy., O.I.S.C., 2200/4400 volts prim., 281/488 Y secy.
3—200-kva. General Electric, 60-cy., air blast type, 2200 volts prim., 370 secy.
6—185-kva. Westinghouse, O.I.S.C., 60-cy., 2200-v. prim., 370 secy.

ARCHER & BALDWIN, Inc.

114-118 Liberty St., New York, N.Y.

Telephone 4337-4338 Rector.

Turbo-Unit 25 Cycle

8000 KW. latest type Allis-Chalmers, 25-cycle, 3-phase, 6600-volts, with 16,000 sq. ft. surface condenser equipment.

Rotary Converter 60 Cycle

Two 1000 KW. General Electric, 3-phase, 60-cycle, 600 volts D.C., with three OI SC single phase transformers, 13,200 volts, also A.C. and D.C. panels.

MACGOVERN & COMPANY, Inc.

114 Liberty Street

New York, N. Y.

FOR SALE

Five (5) NEW Double TRUCK CARS

Length 45 ft. 0 in. Equipped with 4 G. E. Co.'s 247 Motors and G.E. Co.'s Air Brakes. For delivery October 15th, 1918.

Two (2) Double TRUCK CARS

Length 44 ft. 6 in. Equipped with 4 G. E. Co.'s 203 Motors and Air Brakes. Immediate Delivery.

McGuire-Cummings Manufacturing Co.

Cars and Trucks—Snow Sweepers
Electric Locomotives

111 West Monroe Street, Chicago



CAR BARGAINS

OPEN and CLOSED
MOTOR and TRAIL

Write for Price and Full
Particulars to

**ELECTRIC
EQUIPMENT Co.**
601 Commonwealth Bldg. Phila. Pa.

RATES:

- 1 inch—\$3.00
4 inches—2.90 an inch

(The above rate applies to a 4-inch space in one issue, a 2-inch space in two issues, or a 1-inch space in four issues. The larger spaces following may be used up in a similar way.)

- 8 inches—\$2.80 an inch
15 inches—2.70 an inch
27 inches—2.60 an inch
50 inches—2.55 an inch

Rates for larger spaces furnished on application.

FOR SALE

Immediately Delivery

7000 New Machine Bolts, 1 1/8-in. x 5-in. Square head, hexagon Nut, machine turned, intended for rail joints. Full specifications on request.

Following Second Hand Equipment

- 1—Foster Super Heater, Patent Nov. 17, 1903, No. 744323; pounds of steam per hour, 500. Steam pressure 40 lb. Degrees super-heat, 64. Final steam pressure, 350.
- 2—General Electric Motors. Type MP, Class 6-200-150, 500 volts. 360 amperage. 150 r.p.m.
- 50—B-23 Controllers.
- 12—Westinghouse 38-B Motors, complete, 500 volts.
- 12—Westinghouse 38-B Armatures, only.
- 2—Brill 39-E Maximum Traction Trucks.

Offered subject to prior sale.

Receivers **PITTSBURGH RAILWAYS CO.**
B. J. Yungbluth, General Storekeeper,
PITTSBURGH, PENNA.

Direct Current Belted Generator

1—500-kw., 550-V., 320 r.p.m.
Cp. Wd. Westinghouse 3 bearing direct current generator.

DUQUESNE
Electric & Mfg Co.

Write, wire or 'phone our nearest office,
Pittsburgh, Pa., or 230 La Salle St.,
Chicago, Ill.

FOR SALE

Equally as good as new, approximately fourteen miles 2/0 bare grooved

TROLLEY WIRE

and four miles 4/0 in long lengths, second-hand, but in first-class condition.

HENRY A. HITNER'S SONS CO.
Station "K," Philadelphia, Pa.



SEARCHLIGHT SECTION

FOR SALE—Immediate Delivery

Complete Equipment of Power House

consisting of—

- 1—Heine Boilers, 250 hp. each with 115—3½-in. tubes, 18 ft. long, single drums 48 in., operating at 125 lb. pressure. Grates hand fired, 6 ft. x 8 ft. Boiler feed pump 4½ in. x 7 in. x 8 in. Service pump, 10 in. x 6 in. x 10 in.
- 2—Hamilton Corliss non-condensing engines, 28 in. x 48 in., 100 r.p.m. (one engine steel bushed to 26 in.), flywheel 18 ft., 42-in. face, belted to
- 2—400-kw. Kestinghouse Generators, 375 r.p.m.; belt centers 33 ft., 40 in. belt.

- 2—Generator Panels with switches, instruments and circuit breakers.

The foregoing equipment was installed in the year 1900 and is now in good running order and excellent condition. Now on the market on account of arrangement just effected for purchase of power from The Union Gas & Electric Company. Price will be made *only* on complete equipment in Power House at North Bend, Ohio (Cincinnati freight limits). Purchaser to dismantle and load on cars. Railroad switch, New York Central lines, on premises.

Also—

5 Interurban Cars

made by Jewett Car Company in the year 1900, equipped with 4 G. E. 57 motors. 2 G. E. B. 8 controllers Peckham trucks, Christensen 1 AA air brakes, 33 ft. wheels, seating capacity 44, length over all 42 ft. 6 in. Passenger compartment 16 ft. 6 in. Smoking compartment 11 ft. 0 in.

Electric heating system. Weight 25 tons. All these cars are in good operating condition and ready for immediate shipment. Price will be made on one or more of these cars f. o. b. North Bend, Cincinnati.

Address inquiries to Stanley Shaffer, Attorney for C. E. Hooven and Edgar Stark, Receivers of

The Cincinnati, Lawrenceburg & Aurora Electric Street Railroad Company
30 Atlas Bank Building, Cincinnati, Ohio

CLEVELAND ARMATURE WORKS
Cleveland, Ohio

**Everything in the Line
of Repairs to Electrical
Machinery**

Complete Armatures, New Armatures,
Rewound Armature Cores, Armature
Shafts, Armature Coils, Fields and
Commutators.

Established 22 Years

85 lb. A. S. C. E. Relays

10,000 tons—with Angle Bars to match.
Available immediate shipment and centrally
located.
We positively own these Relays and offer
same in carload lots and over.
20,000 tons—Relays—size 25 lb. to 100
lb. in stock our Pittsburgh yards and
vicinity.
Immediate shipment guaranteed and prices
very attractive.
Carload and less than carload inquiries and
orders solicited.
Relays cut to lengths for structural purposes.
Frogs, Switches, Bolts, Nuts, Splices and all
Accessories.

L. B. FOSTER COMPANY
Park Building, Pittsburgh, Pa.

FIRST Get Bulletin 237—or, Wire
ZELNICKER IN ST. LOUIS
Before buying or selling
RAILS

Locomotives—Cars—Tanks
Machinery, Piling, etc.
What have you for sale?

FOR SALE

3—400-kv-a. Westinghouse, oil insulated, self-
cooled, outdoor type, single phase
TRANSFORMERS
60-cycle, 25,000-volt primary, 2500-volt secondary.
Delivery after July 15, 1918
Alabama City, Gadsden & Attalla Ry. Co.
Gadsden, Ala.

SOME ONE WANTS TO BUY

the equipment or machinery that you are now using.
This may be occupying valuable space, collecting
dust, rust and hard knocks in your shops and yards.

SELL IT BEFORE DEPRECIATION SCRAPS IT.

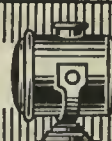
THE SEARCHLIGHT SECTION IS HELPING OTHERS
—LET IT HELP YOU ALSO.



SEARCHLIGHT



SECTION



GET YOUR WANTS INTO THE "SEARCHLIGHT"

ADVERTISING RATES

Ads Set in Uniform Style

(Solid, in one paragraph, without display.)

THREE CENTS A WORD, minimum charge 50 cents an insertion, payable in advance, less 10 per cent. If one payment is made in advance for four continuous insertions—for advertisements under:

Positions Wanted	Vacation Work Wanted
Evening Work	Futuring
Wanted	Salesman Wants Connections

FIVE CENTS A WORD, minimum charge \$1.50 an insertion, for advertisement under:

Agencies Wanted	Positions Vacant
Agencies Wanted	Partner Wanted
Business Opportunities	Representations Wanted
Desk Room for Rent	Salesman Wanted
Educational	Patents for Sale
Employment Agencies	Plants for Sale
Desk Room Wanted	Sub-Contracts Wanted
Foreign Business	Work Wanted
Miscellaneous for Sale, for Rent or Want Ads.	

THIRTY CENTS A LINE, minimum five lines, for all undisplayed advertisements set with a paragraph for each item or tabulated.

THREE DOLLARS AND SIXTY CENTS AN INCH for advertisements for bids (Official Proposals).

Ads Set in Display Type

(Individual space, within border rules.)

Space for these advertisements is sold by the inch. Each page contains 27 inches. The rate per inch is based on the total number of inches to be used—that is, the number of inches the advertisement is to occupy multiplied by the number of insertions it is to receive. For instance, a 2-inch advertisement in 2 issues earns the 4-inch rate of \$2.90 an inch. A 1-inch space in 4 issues, or a 4-inch space in one issue, also earn the 4-inch rate.

SCHEDULE OF RATES

1 to 3 in., \$3.00 an in.	15 to 26 in., \$2.70 an in.
4 to 7 in., 2.90 an in.	27 to 49 in., 2.60 an in.
8 to 14 in., 2.50 an in.	50 to 99 in., 2.50 an in.

Rates for larger space furnished on request.

*For quick and satisfactory results
tell the reader everything that
he will want to know.*

INFORMATION

ALLOW FIVE WORDS for the address. If replies are to a box number in care of any of our offices. There is no extra charge for forwarding replies.

IN REPLYING TO ADS, do not enclose original testimonials or anything that you may want returned. State your experience and qualifications in as concise and neat a manner as possible and enclose copies of your testimonials.

BE CAREFUL TO PUT ON ENVELOPE, when answering any "blind," ad, the box number in the ad, the name of the paper, and also the local address of office to which reply is sent:

361 St., at 10th Ave.,	New York
1870 Old Colony Bldg.,	Chicago
657 Leader-News Bldg.,	Cleveland
935 Real Estate Trust Bldg.,	Philadelphia
501 Kialte Bldg.,	San Francisco

WHEN ADVERTISING MACHINERY, use your own name and address—or a local address of some kind—so that the readers can wire direct and get quick replies. We advise also that you state in your advertisement the present location of plant that is offered for sale, or point of delivery provided you are in the market for equipment.

TO SIGN YOUR NAME and address to your advertisement begets the confidence of the reader and facilitates receiving replies. You can, however, obviate delay in receiving answers by signing your ad, only with initials (your own or others), care of your home, your office or a post-office box number in your city.

POSITIONS VACANT

CHIEF Clerk to Auditor wanted. Must be familiar with interstate Classifications, and a live wire capable of taking entire charge of Auditing Department, City and Interurban property. State age, salary required, education and experience. P-222, Elec. Ry. Journal, Chicago.

TRAVELLING Auditor wanted to check Freight and Ticket Agents' Accounts. State experience, age and salary expected, and give references. P-221, Elec. Ry. Journal, Chicago.

SMALL road in Illinois wants experienced master mechanic who has demonstrated his ability to maintain rolling stock efficiently. Give full information in first letter. Address P-231, Elec. Ry. Journal, Chicago.

MEN (for essential industry) to break in as power and sub-station operators, 8 hours per day, paid while learning, good chance for advancement. Electrical experience desired, but not required. Apply 8 to 10 a. m. at 3046 Fulton St., Brooklyn.

NIGHT car barn foreman wanted, and six general repair men. Address Little Rock Railway & Electric Company, 115 West 4th Street, Little Rock, Arkansas.

POSITIONS WANTED

ENGINEER—Valuations, several complete appraisals. Also experienced maintenance of way, construction, designs in steam, street, interurban railways and structures. Fifteen years' experience. Age 36; married. Salary, \$250. References exchanged. PW-237, Elec. Ry. Journal, Chicago.

Little "WANT" cards
bring big results in the
Electrical Railway Journal

POSITIONS WANTED

ENGINEER—Mechanical graduate, specialized in rolling stock, open Sept. 1st for temporary or permanent position with electric railway or manufacturing company, maintenance, construction and efficiency work. Investigation and supervision. For full particulars address PW-227, Elec. Ry. Journal, New York.

GRADUATE electrical engineer, experienced in operation, economy and efficiency study, maintenance, construction and design of electrical equipment and rolling stock. PW-236, Elec. Railway Journal, N. Y. C.

DESIGNING engineer and manufacturer having nearly 20 years' experience in electrical and mechanical lines, covering development, production, economic manufacturing methods, tools, jigs, dies, fixtures, cost estimating, rate affixing, systematizing, etc., is desirous of becoming affiliated with an electrical, or railway specialty manufacturing company, who wish to expand their lines or improve and cheapen their present product. Would consider a proposition from a well rated agency who desires to manufacture. Experience covers a technical education, employment or association with 8 electrical manufacturing companies in different capacity up to designer and general manager, and apparatus designed embraces railway accessories of various types, such as car signal systems, bells, gongs, lighting fixtures and switches, third rail accessories and fixtures, collectors, overhead fittings, strain clamps, catchers, controller limits, insulators, hangers, plug connectors, lamp guards, gear cases, mine accessories, etc. Also have designed and developed a complete line of railway and railroad headlights, searchlights and floodlights, together with the combination of resistances, switches, etc. Other electrical apparatus includes disconnecting and high tension switches of various kinds, protective devices, automatic and manually operated circuit breakers, crane controllers, crane motors, crane accessories, fittings and collectors, relays, push button switches, and electric lighting accessories. Have taken out over twenty patents and inventions and am conversant with patent claim. Would be willing to invest between five and ten thousand dollars in substantial company. No preference as to locality. References furnished. Age 33. Married. Native American. PW-235, Elec. Ry. Journal, New York.

60 Tons

7-in Girder Rails

P. S. Co. Section No. 238

HENRY LEVIS & CO.

Commercial Trust Bldg., Philadelphia, Pa.

WANTED

2 Passenger Cars
Complete Equipment
Capacity 45 people

1 Work Car
5-ft. Gauge
Complete Equipment

W234—Elec. Ry. Journal,
Real Estate Trust Bldg., Phila., Pa.

RAILWAY EQUIPMENT WANTED

- 6—G. E. Controllers, either K-12, K-28 or K-35.
- 6—G. E. Handies for above.
- 3—Boxes of G. E. Grids, each with 18 grids, size 8 C. G. in series.
- 3—Boxes of G. E. Grids, each with 3 grids, size 8 C. G. in series, and
- 9—Grids, size 10 C. G. in series, and
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Westinghouse Traction Brake Co.

Planers. (See Machine Tools.)**Pliers, Insulated**

Electric Service Supplies Co.
National Railway Appliance Co.

Pole Reinforcing.

Hubbard & Co.

Pole Sleeves.

Drew Elec. & Mfg. Co.

Poles and Ties, Treated.

Lindsay Bros. Co.
Page & Hill Company.
Valentine-Clark Company.

Poles, Metal Street.

Hubbard & Co.

Poles, Ties, Posts, Piling and Lumber.

Carney & Co., B. J.
Lindsay Bros. Co.
Page & Hill Company.
Valentine-Clark Company.
White Marble Lime Co.

Poles, Trolley.

Anderson M. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
National Tube Co.
Nuttall Co., R. D.

Poles, Tubular Steel.

National Tube Co.

Postheads.

Philadelphia Electric Company
Supply Dept., The

Power Saving Devices.

Arthur Power-Saving Recorder Co.
Economy Electric Devices Co.
Railway Improvement Co.

Pressure Regulators.

General Electric Co.
Ohio Brass Co.
Westinghouse Electric & Mfg. Co.

Punches, Ticket.

Bonney-Vahlage Tool Co.
International Register Co., The
Wood Co., Chas. N.

Purifiers, Feed Water

Seale & Sons Co., Wm. B.

Rail Grinders. (See Grinders.)**Rail Welding. (See Brazing and Welding Processes.)****Rails, Relaying.**

Leinicher, Walter A., Supply Co., Inc.

Ratnas.

Brill Co., The J. G.
Electric Service Supplies Co.
Hale & Kilburn Corp.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.

Recorders, Power Saving.

Arthur Power-Saving Recorder Co.

WHAT AND WHERE TO BUY**Registers and Fittings.**

Bonham Recorder Co.
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The
Rooke Automatic Register Co.

Reinforcement, Concrete.

American Steel & Wire Co.

Relay, Reverse Phrase.

Philadelphia Electric Company
Supply Dept., The

Repair Shop Appliances. (See also Coil Winding and Winding Machine.)

Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

Repair Work. (See also Coils.)

Cleveland Armature Works.
Columbia M. W. & M. I. Co.
General Electric Co.
Independent Lamp & Wire Co.
Westinghouse Elec. & M. Co.

Replacers, Car.

Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

Resistance, Grid.

Columbia M. W. & M. I. Co.

Resistance, Wire and Tube.

General Electric Co.
Westinghouse Elec. & M. Co.

Retrievers, Trolley. (See Catchers and Retrievers, Trolley.)**Rheostats.**

General Electric Co.
Westinghouse Elec. & M. Co.

Roofing, Building.

Johns-Manville Co., H. W.

Roofing, Car.

Johns-Manville Co., H. W.
Pantacote Co.

Sanders, Track.

Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Holden & White, Inc.
Nichols-Lintern Co.
Ohio Brass Co.
St. Louis Car Co.

Sash Fixtures, Car.

Brill Co., The J. G.

Sash Metal, Car Window.

Hale & Kilburn Corp.

Serapers, Track. (See Cleaners and Serapers, Track.)**Seats, Car.**

Brill Co., The J. G.
Hale & Kilburn Corp.
St. Louis Car Co.

Second-Hand Equipment. (See Searchlight Section)

Archer & Baldwin.
MacGovern & Co., Inc.

Shades, Vestibule.

Brill Co., The J. G.

Shovels.

Hubbard & Co.

Signal Systems, Block.

Electric Service Supplies Co.
Federal Signal Co.
U. S. Electric Signal Co.
Wood Co., Chas. N.

Signals, Car Marker

Nichols-Lintern Co.

Signals, Car Starting.

Consolidated Car Heating Co.
Electric Service Supplies Co.
National Pneumatic Co.

Signal Systems, Highway Crossing.

U. S. Electric Signal Co.

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(See Brake Adjusters.)

Sleeve Wheels and Cutters.

Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Drew Electric & Mfg. Co.
Holden & White, Inc.
More-Jones Brass & Metal Co.
Nuttall Co., R. D.

Snow-Plows, Sweepers and Brooms.

Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Consolidated Car Fender Co.
McGuire-Cummings Mfg. Co.

Soldering and Brazing Apparatus.

(See Welding, Processes and Apparatus.)

Speed, Indicators.

Johns-Manville Co., H. W.

Spikes.

American Steel & Wire Co.
Lackawanna Steel Co.

Splicing Compounds

Johns-Manville Co., H. W.
Standard Woven Fabric Co.
Westinghouse Elec. & Mfg. Co.

Splicing Sleeves. (See Clamps and Connectors.)**Springs, Car & Truck.**

American Steel & Wire Co.
American Steel Foundries.
Bemis Car Truck Co.
Brill Co., The J. G.
Standard Steel Works Co.
Union Spring & Mfg. Co.

Sprinklers, Track & Road.

Brill Co., The J. G.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.

Steps, Car.

American Mason S. T. Co.
Universal Safety Tread Co.

Stokers, Mechanical.

Babcock & Wilcox Co.
Green Engrs. Co.
Westinghouse Elec. & M. Co.

Storage Batteries. (See Batteries, Storage.)**Strand**

Roebling Son's Co., J. A.

Straps, Car, Sanitary.

Holden & White, Inc.
Railway Improvement Co.

Structural Iron. (See Bridges.)**Superheaters.**

Babcock & Wilcox Co.
Power Specialty Co.

Sweepers, Snow. (See Snow Plows, Sweepers & Brooms.)**Switches (Disconnecting).**

Philadelphia Electric Company
Supply Dept., The

Switches, Lock.

Weiss Switch Lock Co.

Switch Stands.

Ramapo Iron Works.

Switches, Track. (See Track Special Work.)**Switches & Switchboards.**

Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Nichols-Lintern Co.
Westinghouse Elec. & M. Co.

Tampers, Tie.

Ingersoll-Rand Co.

Tapes and Cloths. (See Insulating Cloths, Paper and Tape.)**Telephones and Parts.**

Electric Service Supplies Co.

Testing Commercial & Electrical.

Elec'l Testing Laboratories.

Testing Instruments. (See Instruments, Electrical Measuring, Testing, etc.)**Thermostats.**

Consolidated Car Heating Co.
Cold Car Heating & Lighting Co.
Railway Utility Co.
Smith Heater Co., Peter.

Ticket Choppers & Destroyers.

Electric Service Supplies Co.

Ties, Mechanical.

Dayton Mechanical Tie Co.

Ties and Tie Rods, Steel.

Barbour-Stockwell Co.
Carnegie Steel Co.
International Steel Tie Co.

Ties, Wood Cross. (See Poles, Ties, Posts, etc.)**Tools, Track & Miscellaneous.**

American Steel & Wire Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Hubbard & Co.
Johns-Manville Co., H. W.
Railway Track-work Co.

Torches, Acetylene. (See Cutting Apparatus.)

Oxweld Acetylene Co.

Towers & Transmission Structures.

Archbold-Brady Co.
Westinghouse Elec. & M. Co.

Track, Special Work.

Barbour-Stockwell Co.
Cleveland Frog & Cross, Co.
Columbia M. W. & M. I. Co.
New York Switch & Crossing Co.
Ramapo Iron Works.

Transfers. (See Tickets.)**Transfer Tables.**

Archbold-Brady Co.

Transformers.

General Electric Co.
Westinghouse Elec. & M. Co.

Treads, Safety, Stairs, Car Steps.

American Mason S. T. Co.
Universal Safety Tread Co.

Trolley Bases.

Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Holden & White, Inc.
More-Jones Brass & Metal Co.
National Railway Appliance Co.
Nuttall Co., R. D.
Ohio Brass Co.

Trolley Bases, Retrieving.

Holden & White, Inc.

Trolleys & Trolley Systems.

Ford Chain Block & Mfg. Co.

Trolley Shoes.

Holden & White, Inc.

Trolley Wheels. (See Wheels, Trolley.)**Trolley Wire**

Roebling Son's Co., John A.



Sacrifice

If there is one among us who has not made some sacrifice in the past year or two, he should be in an internment camp.

We are doing all we can to help win this war; we are doing it gladly—proud of the chance.

The St. Louis Car Shops is a big plant—probably much larger than you realize, and because of our immense facilities, we are able to proportion our plant capacity so as to take care of the large amount of Government work assigned to us and still continue, with only a slight reduction, our output of St. Louis Cars.

The advice and co-operation of our efficiency engineers is your for the asking—no obligations.

St. Louis Car Company
St. Louis, Mo.

BRAKE SHOES STANDARDIZE

Our Standard Patterns
Reinforced Brake Shoes
Conserve Material, Labor,
Time and Money—
Ask us.

**American Brake Shoe &
Foundry Co.**

30 Church Street, New York

McCormick Bldg., Chicago.

Chattanooga, Tenn.



Where Pennies Save Dollars

The indispensable process is valiantly serving the street railway industry—has served it profitably for years. General repairs and reclamation in shop and car barn; cutting off or building up bad rail ends; rail bonding—even overhead joining—all have been bettered and cheapened by the use of Oxweld Welding and Cutting Equipment.

Oxweld Injector Type Blowpipes are the most efficient and economical, regardless of the source of your acetylene gas supply. Where for portability or other reasons compressed acetylene is used from cylinders, Oxweld Injector Type Blowpipes utilize far more of the contents of the cylinders than will any other type of blowpipe.

The Oxweld Low Pressure Acetylene Generator shown below is the type of installation most economical and satisfactory for stationary service in electric railway shops and car barns.

Write for Bulletin Series 700.

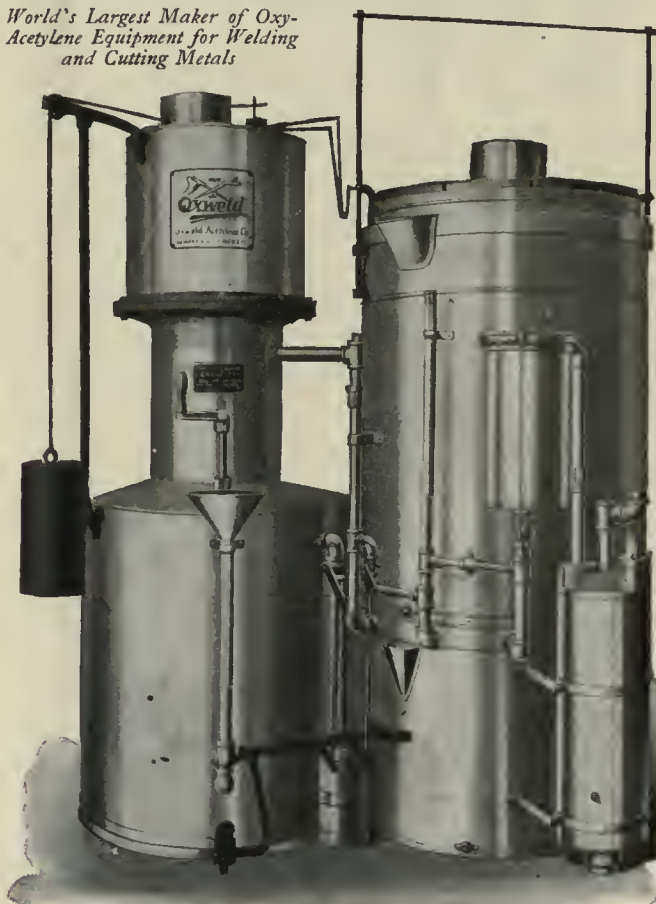
OXWELD ACETYLENE COMPANY

NEWARK, N. J.

CHICAGO

LOS ANGELES

*World's Largest Maker of Oxy-
Acetylene Equipment for Welding
and Cutting Metals*



Oxweld Low Pressure Acetylene Generator

Trucks, Car.

American Steel Foundries.
Bemis Car Truck Co.
Brill Co., The J. G.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.

Tubing, Steel.

National Tube Co.

Turbines, Steam.

General Electric Co.
Westinghouse Elec. & M. Co.

Tunnels.

Percy Mfg. Co., Inc.

Valves.

Ohio Brass Co.
Westinghouse Traction Brake Co.

Varnishes. (See Paints, etc.)**Ventilators, Car.**

Brill Co., The J. G.
Holden & White, Inc.
National Railway Appliance Co.
Nichols-Lintern Co.
Railway Utility Co.
St. Louis Car Co.

WHAT AND WHERE TO BUY**Voltmeters. (See Instruments.)****Water Softening and Purifying Systems.**

Scalfe & Sons Co., Wm. B.

Welders, Portable Electric.

Electric Ry. Improvement Co.

Welding Processes and Apparatus.

Electric Ry. Improvement Co.
General Electric Co.
Imperial Brass Mfg. Co.
Metal & Thermit Corp.
National Ry. Appliance Co.
Oxweld Acetylene Company.
Westinghouse Elec. & M. Co.

Wheel Guards. (See Fenders & Wheel Guards.)**Wheel Presses. (See Machine Tools.)****Wheels, Car, Cast Iron.**

Bemis Car Truck Co.
Griffin Wheel Co.

Wheels, Car, Steel and Steel Tired.

American Steel Foundries.
Bemis Car Truck Co.
Carnegie Steel Co.
Standard Steel Works Co.

Wheels, Trolley.

Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Eureka Co.
General Electric Co.
Hensley Trolley & Mfg. Co.

Holden & White, Inc.
Johns-Manville Co., H. W.
More-Jones B. & M. Co.
Nuttall Co., R. D.
Star Brass Works.

Whistles, Air.

General Electric Co.
Ohio Brass Co.
Westinghouse Traction Brake Co.

Wire Rope.

American Steel & Wire Co.
Roebbling's Sons Co., John A.

Wires and Cables.

Aluminum Co. of America.
American Elec'l Works
American Steel & Wire Co.
Bridgeport Brass Co.
D & W Fuse Co.
General Electric Co.
Roebbling's Sons Co., John A.
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Collier Service at San Antonio

CARDING OF NEW (ADDITIONAL) CARS

When a railway company adds new cars to its equipment, the carder should see to it that cards are placed in them, so that they may not appear on the streets without cards. Each carder usually has on hand a few extra cards of each advertiser whose cards are appearing in the cars he handles, and cards from this surplus stock should be used to card the new cars. In carding additional cars the carder should try to place a card for each advertiser whose cards appear in the other cars. (See also transition period.) As soon as the additional cars are carded a record must be sent to the Home Office promptly giving ALL the information called for on the car checking blank and if he does not have a "blank" he should send a "blank" to the Home Office.

Because of its heavy cantonment travel the San Antonio Public Service Company has made large additions to its rolling stock.

Changes like these and others, as noted in the extract from the Collier Service bulletin on "Carding Cars" are immediately reported to headquarters by the local Collier Service representative.

The necessary additional cards are then forwarded to insure every buyer of Collier Service getting the largest amount of display as quickly as possible.

Only by this careful attention to fluctuating conditions in the use of rolling stock, has Collier Service maintained that high standard of car card advertising which stabilizes the revenue of the railway from this source of income.

Barron G. Collier
INCORPORATED

Candler Building
220 West 42nd Street, New York City



Here are the famous Columbia Electric Hoists

shown contributing to repair shop economy.

Why economy?

Because they are made according to a special design of great simplicity and efficiency.

Will elevate a 50-ton car 6 feet in five minutes, *without swaying*.

Any old traction motor will run them.

Columbia Machine Works & Malleable Iron Co.

Atlantic Ave. and Chestnut St.
Brooklyn, N. Y.

W. R. Kerschner Co., Inc., N. Y.
Halden & White, Inc., Chicago
F. F. Bodler, San Francisco
Railway & Power Eng. Co., Ltd.
Toronto, Ont.

Columbia Repair Shop Specialties and Car
Equipment Include

TOOLS

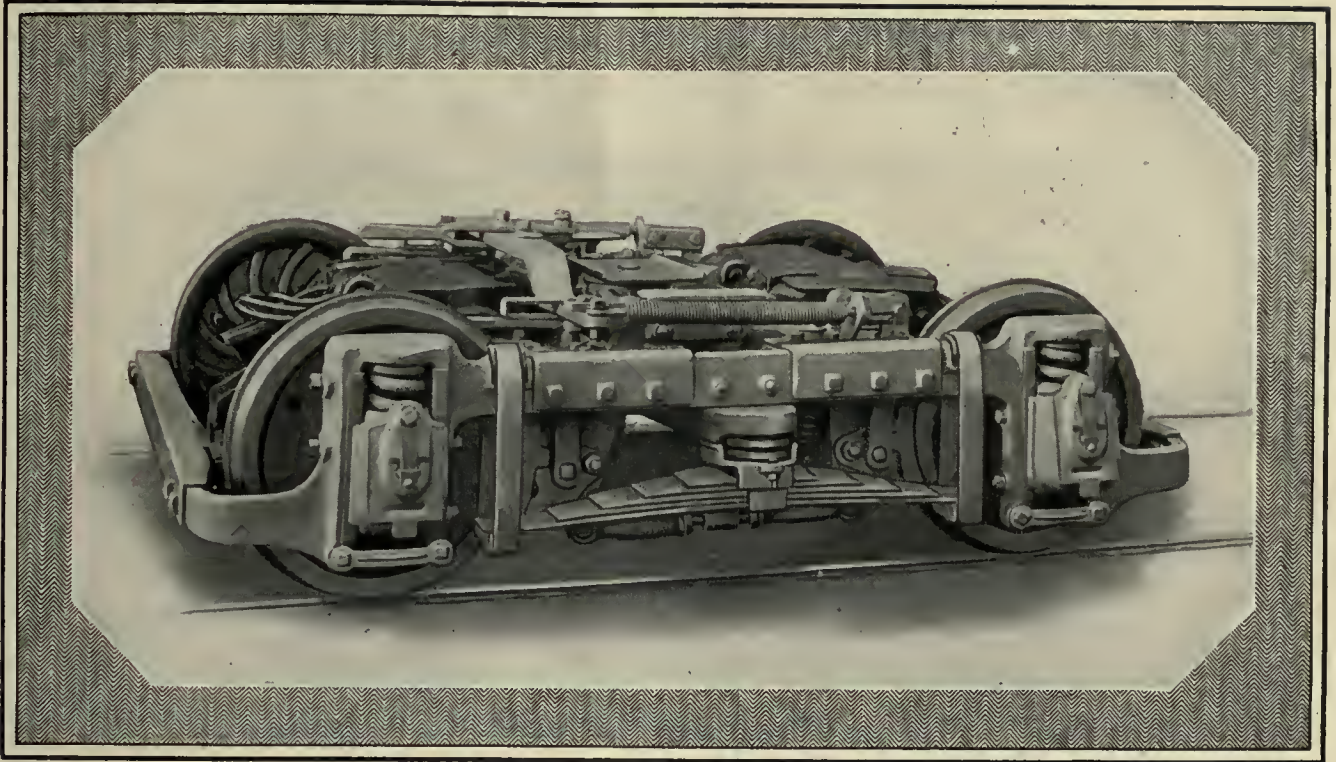
Armature and axle straighteners
Armature shaft straighteners
Armature huggers and stands
Babbittting machines
Banding and heading machines
Car hoists
Car replacers
Coil taping machines for armature leads
Coil winding machines
Pinion pullers
Pit jacks
Signal or target switches
Tension stands



Columbia Repair Shop Specialties and Car
Equipment Include

CAR EQUIPMENT

Armature and axle bearings
Armature and field coils
Bearings (axle and armature)
Brush-holders and brush-holder springs
Brake, door and other handles
Brake forgings, riggings, etc.
Car trimmings
Commutators
Controller handles
Forgings of all kinds
Gear cases (steel or malleable iron)
Grid resistors
Third-rail shoe beams and accessories
Trolley poles (steel) and wheels



The Brill 77-E Truck

This truck bridges the gap between the short-base, outside hung, double-motor, city truck 76-E and the lightest type of 27-MCB interurban truck. With its longer wheel-base than the city truck and its inside-hung motors, the 77-E is well suited to moderate speed interurban service and is used under many suburban cars. Its compactness and its adaptability to small diameter wheels and small motors make it especially useful for low-level cars. The spring arrangement is identical to both single- and double-motor types of Brill city trucks and includes the Graduated Spring System and Bolster Guide, which, of course, means that it is equal in riding quality to these trucks. Its compactness is due to solid forged side frames with their low end frames. "Half-ball" brake hangers, "Oil-retaining" center plates and other special Brill features are standard parts of the equipment of the 77-E Truck. Write for bulletin.

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.

G. C. KUHLMAN CAR CO.
CLEVELAND, OHIO

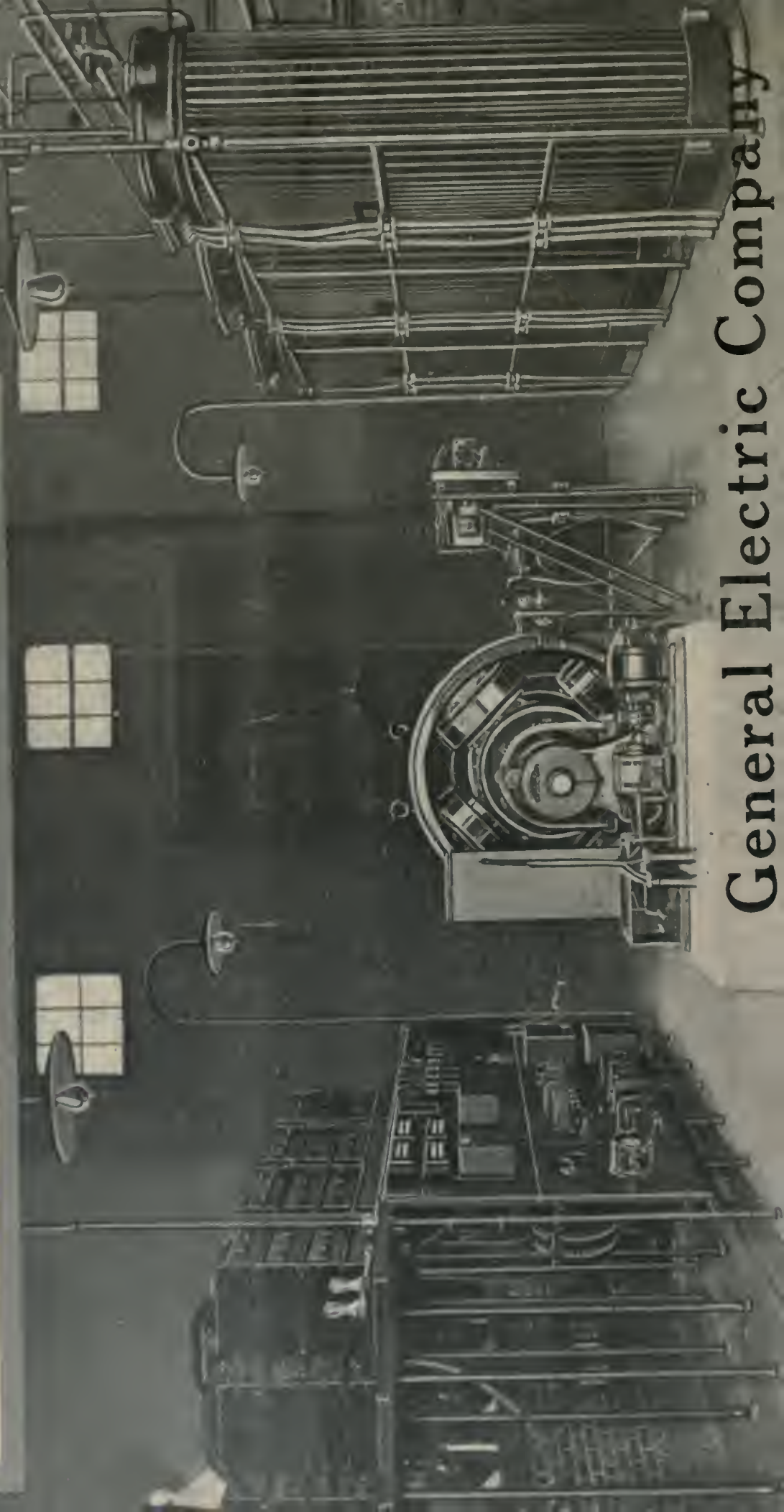


AMERICAN CAR COMPANY
ST. LOUIS, MO.

WASON MANUFACTURING CO.
SPRINGFIELD, MASS.

Automatically Controlled Railway Substation

Three years ago the General Electric Company developed and installed the first automatically controlled substation for railway service. Since that time they have sold a total of fifty equipments have been sold in capacities ranging from 200 kw. to 1500 kw.



General Electric Company

